The University of Alberta

# INTERDISCIPLINARY COLLABORATION: FACILITATING THE ROAD TO PERFORMANCE

By

Lisa Janeen Rogerson

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Abstract

Reaching high levels of performance is in part due to addressing the four dimensions of performance: technical, tactical, physiological, and psychological (Gould & Damarjian, 1998; Hardy, Jones, & Gould, 1996; Hogg, 1995). Inappropriate focus on one dimension, at the expense of others, has been identified as a possible reason for poor performances (Gould, Guinan, Greenleaf, Medbery, & Peterson, 1999). A potential approach to address inappropriate focus is the inclusion of experts from several sport disciplines in the training plan process. The Canadian Sport Centres (CSCs) have introduced Performance Enhancement Teams (PETs) that include members from sport-science disciplines, who work together with the coach to enhance training programs using an interdisciplinary collaboration (IC) approach. This approach has been successful in healthcare, resulting in more holistic care to patients (Ray, 1998) and has the opportunity to be successful in sport as well. Interdisciplinary collaboration allows for more information to be shed on a particular topic, providing different perspectives and a deeper understanding of the situation. The sport scientists collaborate to ensure optimal performance and if problems occur, identify when factors can be changed, altered, or improved (Botterill & Wilson, 2002). Successful performance is a result of collaboration between single sports science disciplines (Goldsmith, 2000). Few studies have examined IC in sport; thus, the purpose of this study was to examine IC in sport, focusing on who was involved, what they did, and how they did it. An interpretative approach using interviews, observation, field notes, and document data was employed. Data analyses

identified salient factors that make IC effective, including shared knowledge, implicit communication, sharing a common philosophy, and team cognition. The benefits and barriers of IC are also highlighted along with a discussion of PET development. In the end, this research could be very important to elite athletes and coaches who strive for consistent high-level performance and want to develop a PET to help them. Sport scientists can also gain from the outcome of this study because they may see the benefits of IC and might be more amendable to working in an IC setting.

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## Abbreviations

| | |
|---|---|
| CSC | Canadian Sport Centre |
| CI | Contextual Intelligence |
| IC | Interdisciplinary Collaboration |
| IPS | Ideal Performance States |
| NCI | National Coaching Institute |
| PET | Performance Enhancement Team |
| SPC | Sport Psychology Consultant |

# CHAPTER 1: INTRODUCTION

Recently in health care, and now in sport, there has been a movement revisiting the idea of collaboration among varying professions in the hope of improving service to clients (Burwitz, Moore, & Wilkinson, 1994; Goldsmith, 2000; Mills, 1996; Ray, 1998). This call for collaboration, initially from healthcare, has been echoed in the field of sport psychology (Feltz, 1992; Gordin & Henschen, 1989; Hanin, 1999; Landers, 1981) where collaboration has been defined as the possibilities of productivity when two or more individuals seek a common goal with different but complementary perspectives (Weiss, 1998). Collaboration can also signify working or acting jointly, sharing in scientific or other intellectual production implying the themes of interdependence, integration, and mutual respect. Unfortunately, it seems as if sport scientists continually advocate the benefits of interdependence but do not maximize what it has to offer (Weiss, 1998). The need for autonomy in sport organizations and sustainable collaborative efforts with others will become important component of future successful amateur sport organizations (Patrick, 2001). Research, specifically directed towards understanding the mechanisms and processes underlying sports performance in realistic sports situations is also critical (Burwitz et al., 1994).

Collaboration can occur between individuals of the same profession (monodisciplinary) or from different professions (multidisciplinary) who work in isolation from each other with the same client. However, when individuals from different professions work together for the benefit of a client, interdisciplinary collaboration is present. The interdisciplinary approach has been effective in

healthcare (Ray, 1998), and also has the opportunity to be successful in sport. Interdisciplinary collaboration (IC) is defined by the involvement of several disciplines or fields (Burwitz et al., 1994) brought together for a common purpose. The approach allows for more integration of ideas and decreases the possibilities of half-truths (Mills, 1996). Collaboration allows for more information to be shed on a particular topic, providing different perspectives and deeper understanding of the situation allowing an accurate assessment of the issue to be determined. In essence, IC is a reinvestigation of an old idea, as it has been discussed by many disciplines in the past, but was not vigorously pursued for two reasons: researchers were unsure how to approach it, and there were too few opportunities to convey this "new" knowledge in a formal manner (Mills).

With the development of the Canadian Sport Centres (CSCs) there are more opportunities for professionals from different disciplines to collaborate on research and sport programs involving athletes and coaches at an elite level. Many of the CSCs have in place Performance Enhancement Teams (PETs) that consist of service providers from various disciplines who work directly with coaches and athletes to create and maintain high performance training programs. These teams are essentially work teams that are brought together for ongoing support for the coaches and athletes. Since CSC programs are coach-driven and athlete-focused, it is the responsibility of the head coach to lead the PET activities by ensuring regular communication with the team of experts (Dale Henwood, personal communication, December, 10, 2001). An athlete-focused program directs the service providers to consider multiple perspectives when devising a training

program and keeps the needs of the athlete in the forefront. The rationale for the development of, and need for, a sport science support program stems from the requirements of performance (Smith & Norris, 2000). Also, coaching at the national and international level requires the integration of many specialist areas in order to achieve high levels of performance. These performance areas include: technical (techniques/ skills to be learned, mastered and executed), tactical (plans, routines, and strategies to create, maintain and safeguard performance), physiological (conditioning of the body, muscles, and energy systems required for sustained effort), and psychological (composure and mental skills training) (Gould & Damarjian, 1998; Hardy, Jones, & Gould, 1996; Hogg, 1995). Professional experts in these areas support the coach in their development of the athlete with the understanding that preparation of an athlete to achieve podium success may take four to six years or longer after achieving national team status (Smith & Norris). Development and stabilization of performance dimensions must occur so that there is a mastery and reliability of performance, thus the optimization of the four areas of performance.

To understand how these dimensions affect performance Gould, Guinan, Greenleaf, Medbery, and Peterson (1999) conducted a study recording athletes' thoughts after the Atlanta Olympic Summer Games. Teams that failed to meet performance expectations stated "too much emphasis was placed on the mechanical and physical aspects of performance, while the 'human' aspect of performance and mental training were ignored" (p. 379). Conversely, teams that met or exceeded performance expectations reported they approached preparation

and performance from a holistic, well-rounded perspective by consciously and deliberately working on attitude, cohesion, mental preparation, fitness, nutrition, strength training, acclimatization, and enjoyment. Because athletic performance does not occur in a vacuum, sport science providers need to collaborate in order to avoid the mistake of focusing only on one or two dimensions of performance. Focusing too much on optimal psychological states is a common mistake made by sport psychology consultants (SPC) (Gould, 2000). For example, improving concentration or managing anxiety may be the presenting issue, yet other life issues often are involved with a performance decrement (nutritional, social, or physical) and may even become the central concern, but go untreated (Van Raalte & Andersen, 1996).

The sport literature reflects a willingness to explore interdisciplinary approaches in regards to collaboration through effective teamwork. This is evident through the PETs currently being utilized at the CSCs and the importance being placed on including all aspects of performance. Potentially this is an area of great interest to not only SPCs, but to the sport community at large, as both parties have a role to play in developing athletes and ultimately achieving podium results. The purpose of this study was to explore the utilization of IC in sport on performance enhancement work teams at CSCs. More specifically, I explored the processes used in IC, attempted to understand how IC operated in a sport setting, and examined PET members' perceptions of how IC might improve performance. The ultimate goal was to be descriptive and inclusive in understanding these processes by including all issues, themes, ideas resulting from the analysis.

*Research Questions*

The following research questions provided the initial focus and direction for this study and were addressed during the course of the research:

1. How does this PET work?
2. How does IC facilitate athletic training?
3. How does IC provide multiple perspectives?
4. How have members' perspectives been influenced by IC?
5. How is information integrated when collaborating?
6. What types of information and knowledge are shared among PET members?

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# CHAPTER 2: LITERATURE REVIEW

The demands of elite sport require utilization of the four performance dimensions in order to achieve optimal performance. The development of PETs within the CSCs, allows for IC. The idea of collaboration, specifically in an interdisciplinary context, may provide an environment that focuses on a holistic approach to training, which in turn, may have positive consequences for performance. In comprehending how the process of collaboration works in a team environment, the team itself must first be understood. Presumably, if the team (e.g., PET) is functioning successfully, its members are more likely communicating and collaborating effectively. This review will focus first on work teams, how they function, and team effectiveness. Second, the review will outline the literature on interdisciplinary collaboration with specific attention to the field of healthcare and sport. Finally, the history and rationale for the CSCs and PETs will be discussed to provide a background on their development.

## *Work Teams*

There have been many types of 'teams' used in research that range in complexity (Bell & Kozlowski, 2002) and definition (Carron, 1988; Hackman, 1987). However, a team is typically defined as any group of two or more individuals working together for a common goal (Carron & Hausenblas, 1998). Differences in team complexity and definitions might cause some disparity in what constitutes an effective team. In an effort to understand team effectiveness, it is necessary to operationalize "effectiveness". Team effectiveness has been defined as having continuous, ongoing diagnoses and evaluations, a shared

purpose, an understanding of resources, and efficient processes (Hanson & Lubin, 1988). Bendaly (1996) describes an effective functioning team as one that has the ability to balance focus on task and process. Also, effective teams seem to consistently achieve goals while maintaining member satisfaction and loyalty (Anshel, 1994).

To further understand how team effectiveness occurs and how teams function, a look at three areas is required. These areas will be referred to as team characteristics, team processes, and team outcomes. First, team characteristics are composed of the factors that affect the composition of the team and represent various resources both internally (composition of knowledge, skills, and abilities, personalities, group structure) and externally (rewards, training, organizational climate). For example, research on team composition has illuminated some factors that could potentially create or destroy team effectiveness. For instance, the number of members on a team seem to be contingent on the task and the environment in which the team operates (Kozlowski & Bell, 2003), personality links have been found between collective team member personality (characteristics that all members express when in a group) and team performance (Jackson, 1992), and a positive relationship between average team cognitive ability (the averaged level of knowledge among team members) and team performance has been found (Devine & Phillips, 2000).

The second area, team processes, represents the mechanisms that inhibit or enable the ability of a team to combine their capabilities and behaviours (e.g., coordination, communication, shared cognition, cooperation). This research

typically investigates 'simulated' work tasks with intact teams who have presumably been through the formative process. However, research does highlight important factors related to team effectiveness that could be examined in eco-valid environments such as a sport context. One such factor is relatively new and considers the cognitive processes of teams, termed mental models (Mohammed & Dumville, 2001), shared cognition (Cannon-Bowers & Salas, 2001), cognitive consensus (Kilduff, Angelmar, & Mehra, 2000), and collective cognition (Gibson, 2001). Effectively these terms are similar in that they include a common belief or understanding of shared knowledge among team members, a similarity regarding how key issues are conceptualized by team members, and that team members use this knowledge to guide their behavior.

Mental models consist of four content domains: equipment (knowledge of equipment used by the team), task (team goals, performance requirements, problems facing team), member (team characteristics, individual habits, preferences, beliefs), and teamwork (appropriate or effective processes) (Cannon-Bowers, Salas, & Converse, 1993). The theoretical development of this content represents declarative (what), procedural (how), and strategic (context & application) knowledge. Team mental model research could give increased attention to what is known about effective information sharing and the factors that undermine the opportunity for group members to discuss diverse knowledge. It is suggested that team effectiveness will improve if team members have an adequate shared understanding of the task, equipment, and situation (Kilmoski & Mohammed, 1994). In order to achieve a high level of team effectiveness, there is

some knowledge that will need to be collectively learned by all team members, some knowledge that will need to overlap among various dyads or triads, and some knowledge that will uniquely be held by particular individuals within the team. Stasser (1992) recommends that each group member be made aware that he/she may have distinctive information and that members be informed of the types of unique information that others may have. Finally, when members are similar in attitudes and beliefs they can arrive at compatible interpretations, which enable them to reach better decisions. Expected outcomes of shared cognition (or mental models) include better task performance (task-specific), better team processes, which in turn lead to better task performance (task-related) and an increase in motivation via cohesion, trust and satisfaction with the team.

The second process that effects team functioning involves behavioral constructs and mechanisms. These constructs revolve around three key actions: coordination, communication, and cooperation. Coordination consists of the activities required to manage interdependence with team workflow (integrating different actions together as a group at the appropriate time). These essential elements and underlying processes include goals, activities and tasks, individual team members, and interdependencies (Zalesny, Salas, & Prince, 1995). Cooperation is the willful contribution of personal efforts to the completion of interdependent jobs (Wagner, 1995). Communication is the means for enabling the more primary process of coordination and cooperation as it aids task work and teamwork (Glickman et al., 1987).

Finally, team outcomes represent the last criteria used to assess the effectiveness of team actions (such as team cohesion). Cohesion is one of the main factors that measure team effectiveness and team performance. Cohesion has been defined as a multidimensional, dynamic process that results from social interactions and communications as a group works towards a common purpose (Carron et al., 1998). The common goal is usually complex in nature and the factors that contribute to team cohesion can change at any given time. Cohesion involves both task – a group's shared commitment to the goal - and interpersonal – a group's attraction to or liking of each other – elements (Carron, Colemean, Wheeler, & Stevens, 2002; Gross & Martin, 1952).

A proposed model of cohesion in sport is associated with situational, personal, leadership, and team factors that can foster or hinder team cohesion (Carron & Hausenblas, 1998). Many of these factors are similar to those mentioned previously in both team characteristics and team processes. The cohesion model introduces group integration and individual attraction including both task and social aspects. Group integration involves how the members of the group together and 'fit' together (personal perceptions of the group as a total unit). Individual attraction involves why members joined the group and why they stay a part of the group.

Research on situational aspects of a group indicates that members in close proximity will develop a greater bond, depending on the size of the team (Carron & Hausenblas, 1998). Putting members in situations where interaction is inevitable can increase cohesion through proximity and social attraction. The

second factor in the cohesion model is personal qualities of the members. Group members who have similar attitudes, aspirations and abilities will likely be attracted to each other and display stronger commitment to remain a member of the group. For example, if all team members are willing to decline credit for athlete performance and all members believe this is important to a successful team, they will likely be attracted to this characteristic and remain on the team. Personal commitment that is publicly displayed can also attract members of a group who identify with the personal sacrifice. Following the above example, members who are willing to put their own recognition aside might be displaying a sense of personal sacrifice. Lastly, members of a group need to feel satisfaction with the group task and individual members for cohesion to be high. Satisfaction of social interactions, achievement of goals, and recognition can all affect the individual attraction to the group.

Leadership within the group comprises the third factor in the model. The group will have higher cohesion if everyone has a say in decisions and if individuals feel personally compatible to the leader. For example, if the team members favor a democratic style and the leader allows democratic decision-making, the result might be an increase in team cohesion because the team members' needs are similar to the leaders. Lastly, aspects surrounding the team itself will affect its functioning. These include group roles (both role clarity and role acceptance), norms (stability of norms and acceptability to members), recognition, goals and rewards available, communication between members, and success of the team.

Research conducted in sport on cohesion supports a moderate positive relationship with performance (Carron et al., 2002). It appears from the findings that sport teams show a stronger cohesion - performance relationship over work teams (Mullen & Copper, 1994). Yet, the cohesion to performance relationship is salient in work teams when cohesion is defined as commitment to task rather than interpersonal attraction.

Overall, more research needs to be conducted in eco-valid settings to understand team effectiveness and the factors involved. Regardless, team effectiveness can be conceived as multifaceted, with an emphasis on both internal and external criteria.

*Interdisciplinary Collaboration*

Collaboration has been described as the "coming together of diverse interests and people to achieve a common purpose via interactions, information sharing, and coordination of activities" (Jassawalla & Sashittal, 1998, p. 239). Collaborative programs may also consist of professionals making shared decisions, pursuing common goals, and coordinating services to ensure the best care (Powell & Sable, 2001). Collaboration commonly encompasses individuals from cross–professional disciplines or fields, individuals or teams, and members from the same or different organizations (Amabile, Patterson, Mueller, & Wojcik, 2001). Powell and Sable (2001) stated that collaboration across disciplines offers the best opportunity for a holistic approach to meet the complex needs of individuals. Success is often indicated by progress toward achieving the goals of

collaboration, effective team functioning, and achieving benefits for the individual members involved in the collaboration (Amabile et al., 2001).

This collaboration across disciplines or fields has been termed "interdisciplinary" (Burwitz, Moore, & Wilkinson, 1994; Memmott, Marett, Bott, & Duke, 2000; Ray, 1998). The interdisciplinary approach to collaboration has roots in the health care system and has been described as an integrated approach in which members of a clinic actively coordinate care and services across disciplines. The interdisciplinary team must also be defined in terms of a specific patient care context allowing the qualifications of the team members to depend on the situation (Ray, 1998). These teams usually come together for some specific purpose, fulfill that purpose, and then disband. Health care professionals probably spend much more time engaged in multidisciplinary functions than in interdisciplinary functions (Ray).

Differentiation between multidisciplinary and interdisciplinary approaches is based on the amount of information sharing, the number of fields or disciplines involved in the decision-making, and the roles of each individual. For example, a multidisciplinary approach would include several members from different fields (e.g., sport psychology, massage therapist, biomechanist and a coach) who work separately and distinctly apart from each other with the same athlete. Whereas, an interdisciplinary team could have the same members from several different fields that work together as a group on behalf of their client. Further, in an interdisciplinary team, the relationship would have to be much stronger, as the integration of information from more than one subdiscipline of sport science is

required from the outset. Consider the case of an injured athlete (Burwitz et al., 1994): the physiologist and the biomechanist might consider the combined effect of fatigue and technique changes on the injury; the psychologist and biomechanist might evaluate the relationship between attention and technique and their additive effect on the injury; and the physiologist and sport psychology consultant (SPC) might consider the effect of the interaction of fatigue and arousal on the injury. In order to investigate fully, all three scientists might operate with synergy throughout in an effort to integrate their expertise. Thus, the interdisciplinary approach can provide additional information that would not normally be available if a mono- or a multidisciplinary approach was employed. Because of this type of information sharing, IC could decrease the occurrence of half-truths (Mills, 1996). For instance, a recommendation may seem appropriate from one discipline, but might only be a half-truth when information from other disciplines are considered (Botterill & Wilson, 2002). Interdisciplinary input is then necessary to optimize advice and minimize inappropriate and dangerous half-truth suggestions. As team members consider insights and relationships from all disciplines and systems they will be better able to view the athlete as a whole person. This interdisciplinary approach can be of considerably greater value when intervening to help athletes reach their fullest potential by taking into account physical, emotional, and mental health.

In multidisciplinary approaches there is potential for conflict between the conclusions drawn by individuals from different subdisciplines. An interdisciplinary approach in healthcare has an advantage of removing or reducing

this possibility of reaching contradictory conclusions (Burwitz et al., 1994). Following a common assumption of the interdisciplinary approach, decisions are made with each discipline having an equal voice in decisions, and unless each discipline participates in a decision, that decision could be potentially invalid (Ray, 1998). As a result, in a sport environment, the approach considers the additive relationships between many variables from different subdisciplines within sport science. The coach or athlete often has the final decision to implement any suggestions made by the "team".

*Advantages/Disadvantages.* There are many reasons to adopt an interdisciplinary model of collaboration. Some of these benefits include heightened awareness and appreciation of one's own discipline (McKenzie , 1999), a broader understanding and enriched respect on the part of workers for other disciplines (Ray, 1998; Schofield & Amodeo, 1999), the opportunity for cooperative research ventures (McKenzie; Schofield & Amodeo), an increase in the use of different team members to meet a client's varied needs (Ray; Schofield & Amodeo), the offering of greater objectivity, the development of a mindset for working cooperatively with shared values and attitudes (Ray), and an increase in productivity by reducing competition for the same clientele (McKenzie).

On the other hand, there have also been some barriers or concerns about IC. The most commonly reported barriers include differing status of members leading to unequal benefits of team participation, varying levels of personal commitment among members (Ray, 1998; Schofield & Amodeo, 1999), usage of dissimilar jargon and technologies, role confusion or the blurring of roles, time commitment

- needed or expected (McKenzie, 1999; Schofield & Amodeo), lack of administrative support resulting in a more costly program (Ray), fears of intrusion and the loss of control by members (McKenzie), differences in expectations regarding goals and objectives (Ray), and untrained members in interdisciplinary teamwork (Ray). Fortunately, many of these can be resolved with organizational planning and the use of rules to guide teamwork (See Sundstrom, Demeuse, & Futrell, 1990).

*Effects on performance.* Interdisciplinary collaboration is becoming critical in order to maximize the potential for international success for Canada's elite athletes (Patrick, 2001). In order for IC to effect performance, it must address the four performance dimensions appropriately. The suitability of each performance dimension is often determined by several external factors; the yearly training program, time of season, level of competition, demands of the sport, and any individual weaknesses in specific performance areas.

In choosing the interdisciplinary team, the coach often leads the process and considers which specialist is required in each area. For example, the technical area may include a biomechanist, assistant coach, and/or a motor learning specialist. The physical area may include a strength trainer, sport medicine doctor, nutritionist, chiropractor, massage therapist, athletic therapist, and/or physiologist. The mental/emotional area may include a SPC, mental trainer, and/or clinical/counseling psychologist. Finally, the coach and other specialized coaches (e.g., goaltending coach) usually handle the tactical area. In fact, it is not uncommon for the head coach to be involved directly in all aspects of

performance and for some team members (e.g., injury recovery specialists) to come and go from the team as needed.

Performances may be facilitated with athlete meetings, communication with a team of sport scientists, coaches, and athletes, and the development of a training plan that helps the athlete attain personal bests (McGovern, 1998). Orlick (1983) agreed that athletes need to have constant communication with the various people involved in the training model throughout the training period and not only at critical stages, important events, or emergency situations depending on trust and rapport established. Since training athletes to reach maximum levels of performance cannot be performed by only one person, regardless of level of competence, the coach will need the help of other specialists to establish close collaboration in the sphere of the scientific management of sports training (Cherebetiu, 1980). In fact, talent and effort are often not fully effective without the assistance of several specialists to direct the training program from the biological, technical and psychological point of view (Cherebetiu).

Waide (1999) has argued that to create opportunities for collaboration, each organization must look anew at its leadership roles and the related competencies required to achieve its mission, as well as how it measures results. The paramount question in evaluating these opportunities is, "Will this collaboration make a substantive difference in serving the organization's primary customers?" For example, in the mental domain, the SPC might help the athletes learn more about themselves from a holistic viewpoint, stay injury free, train more effectively (Martin, 1999), and ultimately enhance performance. Even though it is impossible

to quantify which components of athlete development contribute the most to performance excellence, unbalanced or confused mental aspects in an athlete's life can be a significant performance deterrent (Martin).

*Collaboration Models*

The use of existing collaboration models may also help overcome the barriers to effective IC. For example, corporate and business models of collaboration use a hierarchical system that is driven by highly specific goals and carried out by people conforming to clearly defined roles. This type of model stresses productivity and efficiency in which multiple voices or shifting authority are seen as a challenge to overcome (Macduff & Netting, 2000). Hierarchical models of collaboration are widespread in most professions; they are, however, not the whole reality of collaboration (Ede & Lunsford, 1990). Dialogic or interactive models of collaboration are also being utilized.

In interactive collaborative model, there is a relationship between ideas, feelings, and action, which are seen and discussed. It requires the skills of the hierarchical models plus new skills that emphasize interpersonal relationships, supportive behavior and respect for both sides of the equation. Individual roles shift between the parties based on need and the progression of the project.

Collaboration models in sport function differently from business models. The current state of Canadian sport necessitates that new methods or models be adopted because many sport organizations receive very little funding and find it difficult to produce high quality athletic performances with the current lack of resources. This may be important to sports organizations as many see it as their

job to achieve results and develop athletes' skills and abilities. As a result, sport organizations include many partners (financial and otherwise), which in turn, might facilitate collaboration and ongoing joint planning as a fundamental step to avoid duplication, overlap, and the inefficient use of resources (Harper, 2000). The end result is a delivery system that promotes and utilizes IC that is characterized by discipline-specific assessments with some sharing and synthesizing of information across disciplines. Similar to healthcare, sport models often implement and evaluate activities that are independent, occur within discipline settings (Powell & Sable, 2001), and have goals that are discipline-specific with an attempt to incorporate other discipline goals where possible (Orelove & Sobsey, 1996). All team members can orchestrate this, leaving services to be provided within the context of the working environment (Orelove & Sobsey). These service delivery trends are requiring professionals to create and utilize models of collaborative practice distinct to the setting in which they operate (Powell & Sable, 2001).

Sport science delivery has comprised a more "team based" model of collaboration involving athletes, coaches, and sport practitioners (Gowan, Botterill, & Blimkie, 1979; Smith & Norris, 2000; Whitby, 2001) that is similar to the interactive models mentioned above. Smith and Norris (2000) described a system in which each professional attempts to provide both athletes and coaches with practical sport science information that allows them to train and work to their highest potential. In doing so, the sport scientist must have input into the yearly and quadrennial plans and meet regularly with the coach on a weekly to monthly

basis. Although the coach or athlete could interact individually with each sport science provider, the time commitments can become excessive. Thus, interaction with all the providers and regular meetings of the whole group are necessary in order to maintain a clear direction. This type of delivery requires a slow, carefully planned integration into the early training plans.

Hardy and Parfitt (1994) presented a model of collaboration in sport that focused on "equal expertise". They stated that the perceived needs of both athletes and coaches were responded to more effectively by assuming that "athletes and coaches both bring their own very valuable experiences and expertise to bear upon the problems that they face" (p.133). This type of model has origins in the health profession where the collaborative model emphasizes the "collaborative" contributions of all parties. Success of this "helping model" is dependent on the establishment of a cooperative working relationship among the members involved (Curtis & Fine, 1984). The collaborative approach incorporates principles and procedures that are grounded in problem-solving approaches. When consultees are more integrally involved in developing problem-solving strategies, they are more personally invested in the chosen alternative and consequently are more likely to see that the idea is implemented (Curtis & Fine).

*Collaborative Process in Sport*

Philosophically, in sport, the coach and the sports science team are there for the enhancement of the athlete. The coach is seen as the knowledge tree in terms of sports specificity and typically holds a basic understanding of the sciences (Luke, 1995). Collaboration between the coach and the sport scientists

presupposes a deep knowledge – on the part of the latter – of the specific demands of each sport, and an understanding – on the part of the former – of the specific aspects of the human physiology, sport psychology, or nutrition involved in providing effort in each sport (Cherebetiu, 1980). The coach and sport scientists must communicate at the highest level, sharing their knowledge in order to provide the best service for the athlete.

The transition to an interdisciplinary team requires the various disciplines to understand each other; signifying that they have some shared borders. Steps have to be taken to have an effective and efficient team working for the well-being of the athlete (Collins, Moore, Mitchell, & Alpress, 1999). Because the athletes are personally invested in the outcome, it is imperative to discuss the reasons for implementing sport science support with them and provide understandable explanations to their questions (Luke, 1995). Working closely as a unit allows the entire team to be aware of the individual athletes' needs and their emotional, mental, and physical states for best performance, as well as ongoing and emergent issues with the athlete (Botterill & Wilson, 2002).

Confidence and insight regarding training programs and training recovery can often be enhanced through these meetings. Multiple sources of input are not only necessary for good decisions about the athlete, but the experience of coming together can benefit team member functioning. For example, in healthcare, one team found over time they became much more efficient and effective in assessing their clients' conditions and planning appropriate interventions (Memmott et al., 2000).

There have also been calls for collaboration specific to the field of sport psychology (Hardy, Jones, & Gould, 1996; McCann, 2001). This is a discipline that encourages the use of IC and has a small research base using forms of collaboration. However, as Weiss (1998) suggested, many within the field continually advocate the need for collaboration but do not maximize what it has to offer. Morgan (1989) argued that sport psychology researchers were the "most isolated of the isolates" (p.107) and stated forcefully that it was not possible for any individual, operating from the perspective of a given discipline or subdiscipline, to even raise the correct questions much less be able to answer them. Morgan recommended that sport psychology should be carried out within an inter- or multidisciplinary context. Similar views were expressed by Dishman (1990), Feltz (1989), Gould (1982), and Landers (1989). A motor control specialist, Newell (1990), argued that a "cross-disciplinary orientation holds the most potential for the field and therefore, should be true for the practicing sport psychology consultant as well as the researcher" (p.252).

McGovern (1998) examined at the services provided by a CSC and the impact of those services on the athletes. She analyzed questionnaires from 22 athletes, 10 service providers, and 11 coaches representing 16 sports. This study highlighted some difficulties in a non-collaborative delivery approach; for example, many athletes were disappointed in the information or lack thereof that they received from sport scientists. When the consultant was not located in the city, the athletes became frustrated and felt that they should have had someone more available and willing to work with the team more often. The athletes admitted that with more

communication between themselves and the PET, a better system of organization and scheduling, and a more individualized program, their negative feelings may not have occurred (McGovern). Hence, working in a collaborative setting seems to require a careful balance between self-management and collaboration by all involved, for athletes, coaches, and sport scientists to learn as a result of high levels of cooperation and communication (Patrick, 2002).

*Canadian Sport Centres*

The CSCs were established to create a physical and psychological advantage for athletes living and training in the cities housing a CSC. Currently there are eight CSC across Canada providing services to athletes and coaches. Some of these Centres are located within the physical structure of a University and others are virtual centres without a brick and mortar building. The CSCs have primarily two objectives; one to achieve podium performance and the other, to promote the holistic development of athletes from community to international levels (Robertson, 1997). A key feature of the CSCs is an enriched and strengthened high performance environment (Robertson) that promotes opportunities for research, collaboration with top professionals, and an interdisciplinary approach (McGovern, 1998). The Advisory Group (1995) also reported that the CSC in Calgary has exemplified a high performance environment and the use of IC. This was accomplished through the direct involvement of CSC service providers on a Performance Enhancement Team (PET), which played an important role in the success of CSCs. The PET is a group of service providers who work together with coaches and athletes to deal directly with performance related issues by sharing

ideas and information. The CSC uses a coach-driven athlete-centered philosophy in coordinating the PET that is usually led by the head coach. The PET combines aspects from both the team and equal expertise model of collaboration through regular team meetings to integrate the performance dimensions and training programs. As the PET discusses performance detriments (both before and after a poor performance) problem-solving processes are necessary for finding effective solutions. Collaborative PET efforts when integrated into the training program can enhance the potential success of athletes and ultimately the effectiveness of the CSC itself (Patrick, 2001). Accordingly, the general manager of the CSC Calgary, "the Centre is a catalyst in terms of getting people together, facilitating relationships at so many levels, and acting as a catalyst in increasing the standard of performances" (Robertson, 1997, p. 8).

An interdisciplinary approach has historically had an impact on high-level coaches (Smith & Norris, 2000). This is because a better-prepared coach, in theory, produces better-prepared athletes. The various components of the coaches' yearly plan must be viewed in light of athlete performance results (McGovern, 1998). Access to interdisciplinary experts contributes to the development of coaches and athletes because one coach can't know everything in all areas of training (Goldsmith, 2000; McGovern). The role of the coach as a resource manager is more important then ever because to be successful, coaches must manage and coordinate a multitude of resources (Goldsmith, 2000). Robertson (1997) provided an overview of several CSCs in which one coach claimed, "the guidance that the experts bring to the programs on a day-to-day basis and the

support in terms of monitoring and evaluation in a systematic way are two big advantages of the Centre" (p. 7) and "developing relationships with like-minded coaches and sport science experts can really move you along the continuum of acquiring the requisite skills to become a world-class coach" (p. 7).

During IC, the PET collaborates regularly on issues, situations, and outcomes that might be affecting an individual athlete or a team of athletes. Interdisciplinary meetings include the coach and various service providers from different disciplines. Knowledge from the various subdisciplines can be combined to more accurately and comprehensively understand an athlete's problems (Botterill & Wilson, 2002). In order to do this the athlete must be involved in the planning process of training as well (McGovern, 1998).

A call for collaboration and the use of interdisciplinary approaches within sport organizations has created a system where each partner benefits from the other's existence in their quest for optimal sport performance at national and international levels (Hardy & Parfitt, 1994; Smith & Norris, 2000). This brought about a change in the operational philosophy of sport science, which is now built around an interdisciplinary approach to the delivery of sport science (Smith & Norris, 2000). This collaborative approach allows sport scientists a venue for applied research that consists of interdisciplinary cooperation in the disciplines of psychology, physiology, biomechanics, nutrition, and motor learning (Landers, 1981). Establishing an elite athlete development system in Canada (such as the CSCs) is not enough. Once in place, there must be a continual effort to improve the system and its components (e.g., PET) to produce podium sport performances

(Whitby, 2001). Improvement through IC as a way of life may be one sustainable advantage in elite sport and unless the process is understood and guidelines for collaboration suggested, increased efforts to improve results might be less effective. Understanding how IC facilitates the optimization of the performance dimensions may lead to greater understanding of the use of IC and its role in producing high-level performances.

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# CHAPTER 3: METHOD

This study consists of research that represents a system of assumptions, expectations, and beliefs that support and inform the research (Glesne & Peshkin, 1992). Qualitative approaches consider the researcher as an instrument within the study (Lincoln & Guba, 1985). Therefore, the researcher's identity, philosophical assumptions, and beliefs should be included as they influence the research process from the questions being asked to the interpretation of the data (Denzin & Lincoln, 1998; Glesne & Peshkin, 1992; Lincoln & Guba, 1985; Sparkes, 1998).

## *Interpretive Approach*

The philosophical groundings of this study are taken from the interpretive paradigm (Heidegger, 1962; Lincoln & Guba, 1985). The purpose of interpretive science is to search for subjective meanings and understandings in the world of lived experience (Hall, 1997). This paradigm attempts to capture and understand the participants' perceptions and views as interpreted by the researcher. The word "understanding" is used in the sense of "coming to an agreement" about some topic (Guigon, 2002). Thus, interpretation becomes a matter of both making and finding: finding what makes sense and making something of what is found (Heidegger, 1962).

In explaining how individuals make sense of their world, Thagard (1989) has suggested the Coherence Theory of Knowledge, which follows a constructivist epistemology. According to this theory, the relationship between two perceptions (propositions) is their coherence with each other, or other perceptions, that enable the individual to confirm the knowledge is "true". Coherence helps that person adapt or "fit" his/her subjective experience with the world in which they live. As individuals build

"models" that are coherent with other models they already possess, sense, or have communicated they develop multiple maps of the world (Strean, 1998). In this way, knowledge is constructed rather than passively received as a completed mapping of outside objects. When considered in light of research as a similar process, the interpretation of data involves being innovative and creative, going beyond the immediate given context, and bringing forth new perspectives and interrelations within the data (Kvale, 1996).

*Ontological/Epistemological assumptions.* The interpretive approach used in this study borrows some assumptions from hermeneutics and constructionism, which support the notion of multiple realities. Heidegger (1962) and his student, Gadamer (1975) (researchers at the forefront of hermeneutics) shifted the focus of hermeneutics to an ontological one. Instead of centering on questions about the proper method for interpreting humans and their creations, they were more concerned about how the entities that interpret and understand themselves came to be.

As an interpretive stance, hermeneutics is an explicit approach to working out the pre-understandings individuals have about their surrounding world; "the working out of possibilities projected in understanding" (Heidegger, 1962, p. 189). Illustrating how pre-understanding affects interpretation, the concept of a hermeneutic circle shows how any interpretation by the researcher starts from some set of anticipations and expectations about what the text as a whole or individual is trying to say. As the researcher interprets a particular passage or statement in the light of a prior grasp of the whole, new interpretations are revised and reconfigured into a changed understanding of the whole. For example, a researcher enters an interview with preconceived notions about what s/he

will find. Based on reflections from the interview and reading the interview transcript, the researcher might alter his/her original notions changing the preunderstandings s/he will bring into the next interview. According to Gadamer (1975), this process is more like a spiral than a vicious circle as new interpretations arising from preunderstandings end at a different point than where the interpretation began.

Constructionists believe that knowledge is constructed by the individual through interactions with the environment and by reflecting on these experiences people can understand their world and make sense of their experiences (Clark, 2003). The epistemological assumptions (how people gain knowledge) are rooted in the belief that knowledge is a social, subjective construction that is contextualized through language (Heidegger, 1962; Shotter, 1992). Social constructionism has its origins in symbolic interactionism, which states that humans learn to interact with others by assimilating a shared system of symbolic representations that allow for the social negotiation of meaning (Mead, 1934). Berger and Luckmann (1966) and Gergen (1985) both emphasized the construction of meaning via social psychology, which stipulate that humans are placed into a world with an existing history and culture where meanings are communicated as they make sense within that existing cultural existence.

From the constructionist perspective information is value-laden, compared to the scientific method, where information is theory-laden (Addison, 1992; Guigon, 2002). As Gergen (1985) observed, research and researchers are not value free because value commitments are inevitable by-products of social existence, and as participants in society they cannot dissociate themselves from these values. Additionally, Burr (1995) has summarized four basic assumptions that are coherent with social constructionism and

hermeneutics: (a) the world does not present itself objectively to the observer; but is known through human experience, which is largely influenced by language; (b) the categories in language used to classify things emerge from the social interaction within a group of people at a particular time and in a particular place, and as such, are situational; (c) how reality is understood at a given moment is determined by the communication used at that time; and (d) reality is socially constructed by interconnected patterns of communication behaviour. Within a social group or culture, reality is defined not so much by individual acts, but by complex and organized patterns of ongoing actions. In addition, it is understood that (a) people give meaning to their actions, and these meanings are important in understanding behavior, (b) meaning is not only verbalized, it is expressed in action and practices, and (c) information is always value-laden (Addison, 1992).

In conclusion, from an ontological perspective multiple realities are dependent on individuals' perceptions and purposeful acts based on the perceptions of feelings and events, which shape reality through individual behaviors (Hall, 1997; Lincoln & Guba, 1985). From an epistemological perspective, knowledge is a social, subjective construction in which language contextualizes the meaning of data. Because the knowledge produced from the interviews and observations in this study were both interpretive and interactive, an approach to inquiry that recognizes these processes was required.

*Researcher Preunderstandings*

The topic of this study was personally relevant and interesting because I was a member of a PET a few years ago. The process of interdisciplinary collaboration helped

me understand the "whole" picture of athlete development and performance enhancement. Addressing the athlete holistically allowed me to see some of the interrelationships between the performance dimensions and the importance of addressing these collectively with other disciplines rather than separately. For example, in one instance it appeared that motivation (effort) might have been the athlete's main concern causing performance decrements. However, after speaking with several other people surrounding the athlete, it became clear that nutritional requirements were not being met for the phase of intense training cycle. Once the nutritional aspect was resolved, the effort levels returned. While somewhat simplified, similar experiences lead me to ask whether other training groups were using this approach and if so, was it successful for them? Preliminary personal queries revealed an overwhelmingly negative response from those not using the approach and mostly disbelief that this type of collaboration would produce better results. Most professionals thought the approach would be too time-consuming, too much work with too little agreement amongst team members. As a result, I was intrigued and challenged to more fully explore collaborative processes being used in sport science.

As the researcher, I undoubtedly had an impact on the participants in this study. A "good" interpretation must be creative, through the highlighting and configuring of possibilities, yet faithful to what it set out to grasp. Any "correctness" was conceived in terms of listening to what the individuals had to say, being open-minded, and not imposing my "known" prejudices onto the individual. An aspect of the study that I directly influenced was the interview process and outcome. As with any conversation, the comfort level of both parties could significantly alter the level of trust and willingness to share information. I purposely set out to attain and maintain openness with the

participants by sharing personal anecdotes and stories demonstrating a willingness on my part to share. I hoped that the participants would feel assured by this openness and share their own stories. At times I recognized how my behaviours affected the participants. For example, in one interview I was keenly aware of the time limitations of the interviewee and often looked at my watch mentioning the time. When the participant realized what my concern was about, we established that there was indeed enough time for the interview and the interview continued without pressure. As illustrated above, managing self concerns was a skill that needed constant attention (Whitworth, Kimsey-House, & Sandahl, 1998) because I tripped over my own "blind spots" (Andersen, 2005, p. 295), even with training on this specific skill.

Throughout the data collection and analysis process other concerns about informational and perceptual misconceptions required careful monitoring. Informational misconceptions arise from misunderstanding the possible motives/reasons for behaviors. As discussed earlier, what we know about ourselves and others, and what others know about us, is affected by individual perception or interpretation processes. Perceptual misconceptions occur due to the inability to perceive ourselves as others perceive us. As an interviewer, the meaning, tone and framing of the question can bring about different responses than may otherwise be expected (Kumar, 1999).

The generation and ongoing interpretation of the data required me to make decisions about what to record, what to report, and what was deemed to be important or worthy of interpretation (Fontana & Frey, 2000). As such, my views are embedded in the research process undertaken for this research project. It was my hope to understand the IC in sports science through the experiences of those involved in it. However, as I worked with

the data, interpretations were made, and connections were established between data that do not necessarily represent the views expressed by all the study participants.

The multiplism paradigm enabled me to have thorough, nonconclusive reasons for preferring one admissible interpretation to another as I tried to understand how the thoughts/actions of the participants were reasonable and coherent. In support, Heidegger (1962) claimed that any event of truth can be seen as a disclosing or unconcealing and is simultaneously, a concealing. In other words, by choosing one interpretation over another, I close off or conceal the understanding that one path might have given. In the end, Radcliff (2003) has argued that putting together different interpretations might lead to a better understanding of the whole than its separate parts. The negotiated reality between the participants and myself was ultimately reflected as a dynamic process of socially constructed knowledge.

According to Lincoln and Guba (1985), the researcher role is advantageous in qualitative inquiry because the researcher can: (a) respond to cues and interact with the situation to sense dimensions and make them explicit; (b) collect information about multiple factors on multiple levels simultaneously; (c) function simultaneously in the domains of propositional and tacit knowledge; (d) process data as soon as it becomes available allowing for generation of hypotheses on the spot and the opportunity to test these with respondents in the very situation in which they were created; (e) create opportunities for clarification/summarization; and (f) create opportunities to explore atypical responses, thus achieving a higher level of understanding. These were behaviors that I managed and relied on throughout the data collection process in this research.

In the end, I emerged from one social experience (observation and interviews) to compose another, the report. Through a case study, I assist the readers in the construction of knowledge, making the case study both the process of learning about the case and the product of learning (Stake, 2000). As previously mentioned, in the process of construction, meanings often do not transfer intact, but take on some of my conceptual uniqueness as the researcher. To increase the likelihood of an adequate interpretive account, I employed procedures to endorse methodological rigor, such as purposive sampling, thick description, reflexivity, and triangulation. The latter is generally a process of using multiple perceptions to clarify meaning and verifying the repeatability of an observation or interpretation. Triangulation also serves to clarify meaning by identifying different ways the phenomenon was being seen. (These procedures are discussed in more detail in the data analysis section). Nevertheless, the richness of the data was highly dependant on the quality of the relationships established with the participants (Andersen, 2005).

*Researcher expertise.* I have undertaken training in interview and observation techniques through professional development and coursework. In addition, as mentioned previously, I was a member of a PET and as such had experience consulting with athletes, coaches, and other PET members. I feel that this was the biggest asset and perhaps the hardest obstacle to overcome. Knowing some of the participants in the study allowed for an easier development of rapport and a natural conversation to take place. Also, having been a member of a PET gave me some insider information to the process and jargon used amongst the members. On the other hand, knowing the members was also difficult because I was sensitive to the possibility of their giving answers they thought I wanted,

rather than their true feelings and thoughts. To combat this I interviewed those members more than once and purposely asked the same questions in many different ways to try to get a consistent reflection of their own experience if I felt there was more to uncover. Further, I have been successfully published in peer-reviewed journals and presented my work at peer-attended conferences involving research techniques similar to those used in this study, which lends credibility to my methods and procedures.

*Case Study Format*

This research utilized a case study format, which is not a methodological choice, but a choice of the topic to be studied (Stake, 2000). This study was defined by interest in a particular activity (e.g., collaboration) not by the methods of inquiry used (e.g., interviews). The "case" is a specific "bounded system" that recognizes that certain features are within the boundaries of the case, and other features are outside of it. More specifically, this study was what Stake has called a "collective case study" which, extends to several cases in order to attain a fuller understanding of the questions under exploration (Yin, 1994).

Many advantages of the case study format have been outlined by Blaxter, Hughes, and Tight (2001), and Lincoln and Guba (1985). As a portrayal of a particular situation, it is ideal for providing "thick description" (Geertz, 1973) and linking the results to the participants' actions and insights about their practice. The case report is also responsive to the assumptions of qualitative inquiry. For example, because data are drawn from people's perspectives of their own experiences it is holistic and representative of the constructed reality in that particular setting. Finally, the case study is an ideal vehicle for communicating with those reading it. By providing a vicarious experience of a particular

setting, the case study enables the reader to bring his or her own tacit knowledge to bear on the report as decisions are made about how much transfers to his/her context or experience (Strean, 1998). Disadvantages of a case study include the difficulty in showing relevant connections without losing sight of the "big picture" and the difficulty in knowing where "context" begins and ends. For example, confidentiality might be important in understanding how collaboration occurred, however exploring confidentiality might lead the investigation into areas not directly concerned with collaboration.

Case study formats are characterized by: a) spending time on site; b) being personally in contact with activities and operations of the case; and c) reflecting and revisiting meanings of "what is going on". In doing so, I sought out both what was common and what was particular (different) about the case, with the end result being a presentation of something unique. Thus, an effective investigation is not a matter of "proving a theory true", but exploring the scope and limits of a specific concept informed by a paradigm shared among the members of a research community (Shotter, 1992). The final result is likely to be pervasive, extending to the physical or similar settings, and recognizable to those participants through whom the case can be known. This is aided by the inclusion of the participants' voices, in a narrative style, allowing them a strong presence in describing the topics of interest.

*Participants*

Participants for this study were chosen using a purposive sampling technique (Schloss & Smith, 1999), which involved selecting participants in order to complement the goals of the study. Purposive sampling leads to selecting information rich cases - those from

which one can learn a great deal about the purpose of the research (See Patton, 2002). The participants were chosen based on informational considerations with the purpose to maximize information, not to facilitate generalization. The sample size depended on the knowledge needed, the purpose of the inquiry, what was at stake, what was useful, and what could be done within time or money constraints (Patton).

The initial participants of this study were members of a CSC as a coach or service provider. The service providers were from several professions including sport medicine doctors, nutritionists, sport psychology consultants, strength trainers, physiologists, and athletic therapists. All participants had direct involvement on a PET, which consisted of a group of service providers who worked together to design and maintain yearly training programs and dealt directly with performance related issues by sharing ideas and information.

From the potential PETs across the Canada, two intact PETs were selected for in-depth observation and three additional PETs members were selected for interviews. In total, thirteen PET members were interviewed from three different CSCs. The number of participants was based on the lengthy time commitment required to study the PETs and my financial constraints. Because of this delimitation, the PETs selected for in-depth observation were particularly relied upon for the detailed information they were able to provide. General managers of the CSC's identified potential PET participants, as they knew which PETs were currently active across the country. PETs that were in an active, intense training phrase (e.g., winter sports) were chosen over PETs that were completing a four-year cycle (e.g., summer sports) to ensure the PETs would be involved in team activities throughout the course of the study.

*Procedure*

Possible participants were identified via the CSC with permission of the general manager (Appendix A). PET members and their respective coaches were identified as intact groups and participants were selected from this list. In an attempt to sample a variety of disciplines, some possible participants were overlooked initially if their discipline was already highly represented, with the possibility of returning to them if allowed by time and money constraints.

Permission to conduct the study was obtained through a University of Alberta ethics board and information letters distributed to potential participants by electronic mail, through the CSC, or in person (Appendix B). Once participants signed the consent forms (Appendix C) and were fully aware of their commitment, an interview time was arranged. The participants were asked to complete a demographic form indicating some personal information such as contact numbers, field of study, years on the PET team, and years working at the CSC (Appendix D). One-on-one interviews took place in person (n = 6) or over the phone (n = 7) at a time of convenience for the participant. The interviews were tape-recorded and every attempt to uphold confidentiality was made. For example, participants' names were changed, and unless pertinent to answering the research question, any specific identifying qualities (such as sport) were withheld. In addition, the tapes and transcripts were kept in a locked cabinet not accessible to anyone outside the study. With the in-depth observational experience, I, as a non-participant, observed and made field notes about the PET member interactions (service providers, coaches and/or athletes).

*Data Collection*

Data collection for this study involved four different methods: interviewing, non-participant observation, field notes, and document analysis. All interviews were taped on a cassette recorder either in person or using a device to record over the phone. The interviews were transcribed verbatim to ensure the content was intact as relayed in the interview, and then used for analysis. Some participants were contacted and asked for a second interview to clarify or add information from the initial interview. At this time further observations were clarified and explored in more detail. As part of analytical triangulation, the participants received a final copy of this document in order to provide feedback, concerns, clarification, or add new information.

The field notes from the observations were used for two purposes: one to compare with information from the interviews; and second, to help form questions for the interviews. Some participants were interviewed before being observed and others after being observed. This varied largely due to the participants' availability and timing of any PET meetings. Organizational documents were examined to determine any structures that might influence the participants' collaborative strategies. These documents also provided some insight in forming important questions for the interviews and aided an understanding of the system in which the participants worked.

*Interviews.* According to Kumar (1999), interviews are an appropriate method for collecting in-depth data in complex situations. Interviewing begins with the assumption that the perspective of others is meaningful, knowledgeable, and able to be made explicit. Because of the interactive nature of interviewing, the quality of the information obtained during an interview is as dependent on the interviewer and the person being interviewed

(Patton, 2002). In this research project, interviewing allowed me to explain the questions and supplement understanding with outside sources of information, thus ensuring that the meaning and interpretations of the interview were conveyed as planned. Further to the verbal interaction within an in-person interview, it was important for me to be aware of nonverbal messages as well. This includes being "sensitive to how the interview setting can affect what is said, and carefully attuned to the nuances of the interviewer – interviewee interaction and relationship" (Patton, 2002, p.27).

The type of interview selected for this study was semi-structured in nature. Smith (1995) noted that semi-structured interviews are particularly useful in order to gain a detailed picture of a participant's beliefs about, or perceptions and accounts of, a particular topic. Although there may be some initial guiding questions or core concepts, a semi-structured interview requires no formal structured instrument or protocol. While structured formats might help the respondent to answer easily and the researcher to accumulate and summarize responses more efficiently, they can also constrain the respondent and limit the researcher's ability to understand what the respondent really means (Trochim, 2001). In semi-structured interviews there is an attempt to establish rapport with the respondent. The order of the questions is less important as the interviewer probes interesting areas that arise, accumulates details of respondents' experiences from their own point of view, and follows the respondent's interests or concerns (Seidman, 1998; Smith, 1995). Consequently, semi-structured interviewing is particularly useful for broad explorations of a topic or when the process within a situation is of interest as in the case of this particular study. The six types of open-ended questions identified by Mayan (2001) guided the semi-structured interviews for this study. These

were oriented to the: (a) experience or behavior – to determine what a person does or has done; (b) opinion or values – what the person thinks about the issue; (c) feeling – responds emotionally to the issue; (d) knowledge – knows about the issue rather than thinks or feels about it; (e) sensory – experiences through senses; and (f) background or demographics – factual details. Probing or follow-up questions were also used to explore issues in greater depth.

*Developing rapport.* When entering into an interview for the purpose of obtaining information about the lives of the participants, it is important for a positive interaction to take place. The development of trust and rapport is crucial for rich information to be collected (Fontana & Frey, 1994; Lincoln & Guba, 1985), especially since rapport and trust are "the foundation for acquiring the fullest, most accurate disclosure a respondent is able to make" (Glesne & Peshkin, 1992, p. 79). Rapport has the ability to place limitations on interactions and expressions so it becomes crucial to manage appearance and behaviors by acting in culturally appropriate ways, thereby, helping to foster trust (Glesne & Peshkin, 1992). Essentially, rapport is more easily achieved if both parties get something out of the interaction, such as respect, empathy, and understanding without judgment (Patton, 2002).

Rapport is often established through the use of descriptive questions, often referred to as the grand tour question (Gilchrist, 1992). These are broad open-ended questions that attempt to elicit a rich story that is completely directed by the participant. Several mini-tour questions are then asked that focus on smaller units of experience; for example, "Can you give me an example of when you may have collaborated with a service provider in a different field". Probes are used to deepen the response, increase the richness and depth

of responses, and give cues to the interviewee about the level of response that is desired. For instance, gently nodding or a verbal 'uh-huh' are probes to encourage talking. Thus, probes are follow-up questions that provide guidance to the interviewee. Probing is a skill that comes from knowing what to look for in the interview, listening carefully to what is said and what is not said, and being sensitive to the feedback needs of the person being interviewed (Patton, 2002; Sparkes, 1998). Once rapport has been established it needs to be maintained by making a conscious effort to continue meeting the emerging needs of the relationship.

I attempted to establish rapport by emphasizing any mutual acquaintances, and describing my experiences with the CSC in Winnipeg. I modified speech, behaviors, and appearances as needed to 'fit in' with the environment. In the interviews, an explanation of the study, and the use verbal/nonverbal tracking and bridging techniques (nodding, thanking, encouraging), were employed. At the close of the interview I asked the participants, "What should I have asked you that I didn't think to ask?" in order to communicate my wish to fully understand their perspective.

*Interview guide.* According to Smith (1995) an interview guide can be used to indicate the general area of interest and provide cues to which the participants can respond while still allowing them a strong role in determining how the interview proceeds. The interview guide in this study was produced in advance and included a broad range of themes/areas that could be addressed. These were put in a sequence according to themes and included questions related to areas of interest with suggested further probes or prompts (Appendix D). A successful interview included questions and answers at both general and specific levels and moved between the two fairly seamlessly.

*Pilot interview.* A pilot interview was conducted with a previous PET member and academic professor to assist with the development of the interview guide and to obtain feedback. This feedback included information on tone, nonverbal behaviors, speed of questions, and overall impressions that could aid me in refining my interviewing techniques.

*Observational data.* As researchers actively witness the phenomena they are studying in action (Adler & Adler, 2000), the impressions of the surrounding environment can be gathered as observational data. With the freedom to search for concepts or categories that appear meaningful to the participants, researchers often attempt to think of all the elements needed to tell a story – who, what, when, where, why, and how (Bogdewic, 1992). Through observations the researcher has the chance to learn things that people might be unwilling to talk about in an interview by giving some attention to non-occurrences as well as what actually happens. It offers an insider's view, to see and feel what it is like to be a part of the setting (Patton, 2002). Observation produces increased methodological rigor when combined with other methods as various sources of data can be crosschecked or triangulated (Adler & Adler, 2000). As a non-participant observational researcher in this study, I observed two formal meetings by two different PETs. Also, I observed interactions among PET members in dyads and triads in informal settings.

*Field notes.* Field notes were kept while making observations and interviewing to provide an expanded account of the observations (Bogdewic, 1992) that aided in remembering key events or behaviors. It was designed as a journal, in which thoughts, observations, interpretations, and comments were written as needed. Specific descriptive

information included the date, basic environmental information, direct quotes, personal feelings, insights, interpretations, and possible coding ideas. Descriptions included enough of the context surrounding the activity so that meaningful comparisons and contrasts could be made (Bogdewic). The field notes were also used as an audit trail to help record my perceptions or verify information collected from the participants in the interviews. These perceptions are often changed while in the field and keeping such notes helped me make sense of these influences. Field notes were recorded as soon as possible after the observation to ensure accuracy. To ensure this process, the field notes were written or tape-recorded, for transcription later, depending on the timing and environment.

*Document data.* Documents were used, if available, to corroborate and confirm observations or interview statements and were useful for making inferences about events. Documents included letters, memoranda, agendas, administrative guidelines, newspaper articles, or any document that was relevant to the investigation. The majority of the documentation was located at the CSCs and the quality or quantity differed between each Centre.

*Data Analysis*

Data analysis involves reducing and shaping the interview, observational, and field note material into a form that can be shared and displayed (Strean, 1995) with the assistance of a computer program (e.g., Atlas). Computer assistance can facilitate marking the text, building codebooks, indexing, categorizing, creating memos, and displaying multiple text entries side by side (Patton, 2002). Analysis was set into motion with the first site visit as initial ideas or themes were recorded as field notes. A systematic

pattern of data collection-analysis-collection-analysis took place, as some of the data was analyzed before all the data collection had occurred. In the process of analysis, I analyzed, interpreted and made sense of the data while attempting to capture the richness of the themes inductively rather than reducing the data to preconceived concepts or categories (Seidman, 1998; Smith, 1995). Since qualitative studies ultimately aim to describe and explain a pattern of relationships, inductive analysis works well, especially when the data are unfamiliar and/or excessively complex, a single case is involved, or the intent is exploratory and descriptive (Stake, 2000), as with this study.

Coding the data was an important step in the analysis. It is the process of identifying persistent words, phrases, themes, or concepts within the data so that the underlying patterns can be identified and a codebook can be developed (Mayan, 2001; Patton, 2002). The process began by becoming familiar with the data and organizing the information by reading and re-reading all of the data, highlighting sections of the text, and making comments in the margins regarding anything striking. Next, any overall impressions, points of interest, and plans for working with the data were noted. As a result, the findings came out of the data and through interactions with the data (Patton). This was the initial coding stage and has been labeled in the literature as open coding (Patton, 2002), topic coding (Morse & Richards, 2002) and microanalysis (Hall, 1997).

The next level of analysis involved going beyond the descriptive data by attaching significance to what was found, making sense of findings, offering explanations, and drawing conclusions (Patton, 2002; Smith, 1995). Morse and Richards (2002) have termed this analytic coding, the "taking off" from the data. The purpose of this type of coding was to be alerted to new messages or themes, to allow exploration and

development of new categories or concepts, and to pursue comparisons. It is suggested that the number of categories should be restricted to between 10 and 15 (Mayan, 2001), but I used as many as applicable and sub-categories were created if they were needed.

When developing codes and categories, I dealt with the challenge of convergence - figuring out what things fit together, and the challenge of divergence - fleshing out patterns or categories by extension (building on items of information already known), bridging (making connections among different items), and surfacing (proposing new information that ought to fit and then verifying its existence) (Patton, 2002). This challenge also included the examination of data points that were not supported by any other members. If data points were different from what the majority of the sample was saying I explored them in more detail to clarify meaning and perspective by examining time and context. All of the data were accounted for and represented. While creating categories, Patton (2002) suggested an examination of homogeneity, both internal (i.e., extent to which the data that belong in a certain category hold together in a meaningful way) and external (i.e., extent to which differences among categories are bold and clear). In grouping the data, homogeneity was considered and groupings were altered and changed until they best represented the data.

*Methodological Rigor*

Rigor is important in qualitative research because it helps the researcher conduct what might be characterized as "good" versus "poor" research. It is a matter of practicing good science rather than claiming to be right about a phenomenon (Sandelowski, 1993). The procedures used can be characterized by features that have a list-like quality and can be added to or taken away from depending on the context and the purposes of a particular

study (Sparkes, 1998). Strategies to enhance and maintain rigor take place during the actual conduct of the study itself, and as recommended by Creswell (1998), researchers should engage in at least two.

The first strategy used in this study was choosing an appropriate sample and selecting participants because of their characteristics. Once the research was underway maintaining rigor was characterized by significant engagement on site. In spending a time in the setting, I became substantially involved at the site, which was important to overcome the effects of misinformation, distortion, or presented 'fronts', and to establish the rapport necessary to uncover what was really going on (Mayan, 2001).

Another strategy was to be responsive to the data, by being aware when the material was not as detailed, as rich, or as informative as it should be. The solution was to step back and consider why the data were not fruitful and make any necessary changes to the data collection methods, such as selecting different participants, or observing/ interviewing participants at different times. Further, there was an assessment of the saturation of the data and collection continued until each category was rich and thick. Once saturation was achieved, data points that did not seem to fit were explored; I investigated other similar data points until they were saturated. Saturation occurred when the data offered no new direction, no new questions; there was a sense of having heard or seen it all (Morse & Richards, 2002).

Finally, peer debriefing occurred throughout the data analysis process. This involved the process of engaging colleagues knowledgeable in qualitative interviewing in extended discussions of the findings, conclusions and tentative analyses (Mayan, 2001). The

colleagues asked questions about my values, conjectures, decisions, and suggested possible future steps.

*Thick description.* When reporting qualitative inquiry, it is important to provide a coherent level of description of the data to complement interpretations drawn from the data. Description can help the reader understand the phenomenon studied and draw upon their own interpretations about meanings and significance (Patton, 2002). Thus, "thick description" (Geertz, 1973) is a narrative that describes richly and in great detail all features of the setting. It can provide deep, dense, detailed accounts so that readers are allowed to experience vicariously the essential features of events that have been described and are being interpreted (Strean, 1998). Thick description was provided in this study by including narratives from the participants to help illustrate the findings and tell the story.

*Reflexivity.* The subjectivity of the researcher is a resource for understanding the world being investigated (Sparkes, 1998). Rather than trying to remove subjectivity, qualitative researchers attempt to embrace it so that it can be used as a valuable analytical tool (Brody, 1992; Glesne & Peshkin, 1992). Reflexivity is a way of emphasizing the importance of self-awareness, political/cultural consciousness, and ownership of one's perspective (Patton, 2002). Knowing yourself and your emotions/attachments to certain situations will direct what you pay attention to, how you form questions, and how you choose to see the situation.

In order to assist in awareness of preunderstandings, a journal was kept (as part of the field notes) to provide an on-going account of the directions, decisions, and considerations made during the process. This encouraged examination of assumptions

and actions in a self-aware manner. The journal provided a reflection of my personal epistemologies and also provided a framework for sorting through issues and reporting how these reflections informed the research findings.

*Triangulation.* Triangulation reflects an attempt to secure an in-depth understanding of the phenomenon in question. It is a strategy that adds rigor, breath, and depth to any investigation and is an alternative to validation (Denzin & Lincoln, 1998). A common misunderstanding is that the purpose of triangulation is to demonstrate that different data sources yield essentially the same result. But – the point is to test for consistency, thus, understanding inconsistencies in findings across different kinds of data can be illuminative (Patton, 2002). Data triangulation for this research involved using multiple sources of information because no single source of information was deemed to provide a comprehensive perspective. For example, I could compare observations with interviews, what people said in public versus private, perspectives from different points of view, interviews with documents, and consistency in what was said over time. I built on the strengths of each type of information while minimizing the weaknesses of any single approach (Patton).

A form of analytical triangulation was also utilized, which involved having the participants review the final report to add new information, voice concerns, and give feedback. In essence, the participants provided critical observations or interpretations (Stake, 2000). While similar to member checking, the participants in this study were not being asked to verify the interpretation, because the very act of reading a transcript for accuracy may cause the participant to revise his/her views and/or influence events still to be experienced through the course of the study. The typically narrative nature of the data

makes the problem of determining accuracy of meaning or intention a theoretical and moral one. While both myself and the participants are interested in accounts that represent the experience fairly, we may have very different views concerning what a fair account was (Sandelowski, 1993).

The strategies described above were used throughout this study to establish a trustworthy report. However, any features that might be put forth as characteristics of good research will be constantly subjected to interpretation and reinterpretation as times and conditions change (Holt, 2002).

*Delimitations and Limitations*

As with any research there were some considerations that must be identified in order to define the scope and relevance of any possible findings. By choosing a purposive sample, the findings of this study would only directly relate to those involved at the CSC's, individuals who compete or coach at the national level, service providers, and perhaps the specific sports that were included in this research. Specifically, the findings do not include the athletes' perspectives on the PET or how the PET functions relate to performance. However, indirectly the findings could be relevant to all sport settings in which coaches use an interdisciplinary team or could benefit from using an interdisciplinary team. Secondly, the results may be time sensitive because of the changing nature of sport organizations and interpretations of events. For example, the CSCs may reorganize their PET structures or provide new rules and regulations that inhibit or direct the PET's operations, thus changing the way collaboration is conducted. Finally, the findings may be limiting because some variables affecting the PETs and the specific CSCs were not directly addressed, such as the length of time the CSC had been

in operation, the level of sport competition of the sports involved, time of season of the sports, leadership style used, and the absence of Personality assessments. Results will be difficult to narrow down to a specific type of team, leadership style, type of sport, or to individual PET members.

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# PROLOGUE TO RESEARCH FINDINGS

Prior to discussing the findings of this study, it is important to clarify a few points that will aid in the understanding of these results. First, to reiterate, the purpose of this study was to explore the utilization of interdisciplinary collaboration (IC) in sport on PETs. More specifically, I explored the processes used in IC, attempted to understand how IC operated in a sport setting, and examined Performance Enhancement Team (PET) members' perceptions of how IC might improve performance. The ultimate goal was to be descriptive and inclusive in understanding these processes. Second, while collecting data for this study, PET members often referred to themselves and each other as "service providers". This terminology was adopted throughout, resulting in the use of the term service providers to refer to PET members. Third, the analysis and findings for this research were divided into three separate papers. These papers were written as stand-alone articles so, they share some overlapping information in the introductory sections to inform the reader. Although the papers were meant to be inclusive, they only include an abbreviated methods section to act as a reminder of the data collection techniques and analytic procedures. A more thorough description of the methods and methodology is elaborated in Chapter 3. Finally, the participants are referred to using a coding system that changes from Chapter 4 to Chapters 5 and 6. In Chapter 4 the members were given a number (e.g., P1, P5) and a site reference (e.g., S1, S3). This was necessary to allow for comparisons between the three PETs studied. However, Chapters 5 and 6 the participants are given only a number (e.g., P1, P13) to maintain their anonymity and preserve the

confidential nature of the data when the focus became more narrow and specific. Each of papers represents a distinct grouping of the results that arose from the data. These groupings consist of several key themes or topics that fit together in a coherent way to explain and discuss relevant findings.

In the first paper (Chapter 4), I set the background for PETs by describing in detail the composition of the teams and compare the PETs at different development levels. This discussion examines the individual characteristics of the PET members (including team composition and team size) and cohesion that resulted through the team's collaborative efforts. A key feature of the team composition was the inclusion of the coach. The coach played a pivotal role as the team leader and had unique expectations placed upon him/her, revolving around knowledge, education levels, and leadership capabilities. In addition, factors emerged that were pertinent to effective functioning of the PET. These included adopting a shared philosophy and being located in a centralized area. Finally, this paper explored the PETs as they developed over time and gained experience working together. There were three different sites or locations and the number of members on each PET varied. The paper concludes with an overall summary of the composition and functioning of the PETs and suggestions for future research.

The second paper (Chapter 5) is a more extensive examination of the use of IC, specifically how collaboration occurred and what processes were used. In discussing the various forms of communication, it became evident that informal methods were an essential part of sharing information and observations. These communication patterns facilitated ongoing updating and sharing that was

necessary for effective IC. Knowing what information to share and with who became an interesting dilemma for many service providers. In order to share effectively, members needed to have a deep understanding of the other disciplines (in the form of contextual intelligence) and an understanding of how they delivered their expertise to the athletes. Complicating the matter were the team members' diverse definitions of confidentiality. Since the effectiveness of PETs hinged on their ability to efficiently share information and view the athletes holistically, an understanding of what information could be shared was essential. Yet, each service provider was left to their own code of ethics in determining what was confidential and what could be shared. This Chapter concludes with a summary of the benefits and barriers of IC mentioned by the participants.

The third paper (Chapter 6) explores an outcome of IC, which includes the management of shared roles, team cognition, and implicit communication. Team cognition includes an awareness of who on the team knows what and how this can be facilitated through implicit communication or the ability of team members to act in concert without the need for using overt communication strategies. Once team members had sufficient understanding of each other, as well as some experience in sharing their expertise with each other, they used implicit communication strategies and shared knowledge to guide their coordinated actions. In order to decipher team cognition and the ability to coordinate implicitly, an understanding of roles must exist. Many members came to an agreement about sharing specific responsibilities, even if outside their specific discipline and allowing one member to act on behalf of another. Overall, sharing

roles was viewed as an advantage of the PET, especially when service providers weren't available and a need arose in that area. However, a grey area existed and if a member went beyond it, it signified stepping too far into another member's area of expertise. Exploring these boundary lines left as many questions as answers and helped identify new areas to investigate in the future.

# CHAPTER 4: UNDERSTANDING AND DEVELOPING PERFORMANCE ENHANCEMENT TEAMS

Performance Enhancement Teams (PETs) have become an increasingly popular method of service delivery for athletes and coaches as they strive for podium results. Smith and Norris (2000) described the PET as a model in which service providers from various disciplines provide both athletes and coaches with practical sport science information that allowed them to train and work to their highest potential. Little is known about the nature of these teams, such as, who is involved, how they work, and how they are developed. In spite of this, they are a key feature of the Canadian Sport Centres (CSCs) that provide services to high performance athletes and coaches.

CSCs, established to create a physical and psychological advantage for Canadian athletes have two primary objectives: (a) to achieve podium performance, and (b) to promote the holistic development of athletes from community to international levels (Robertson, 1997). Fundamental to the establishment of the CSCs is an enriched and strengthened high performance environment (Robertson) that promotes opportunities for research, collaboration with top professionals, and an interdisciplinary approach (McGovern, 1998). An evaluation showed that the CSCs have enhanced the training environment for high performance athletes as well as encouraged collaboration and information sharing on a multi-sport basis (The Advisory Group, 1995). A prominent coach remarked "the guidance that the experts bring to the programs on a day-to-day basis and the support in terms of monitoring and evaluation in a systematic way are two big advantages of the Centre" (Johnson, cited in Robertson, p. 7).

It should be noted that PET members (also known as service providers) work closely with the coaches contributing to the coaches' yearly and quadrennial training plans. Coaching at national or international levels requires the integration of many specialist areas in order to achieve high levels of athletic performance. With multiple experts' views, coaches can build more comprehensive training programs that strategically integrate important services (Goldsmith, 2000; McGovern, 1998). Henwood (cited in Robertson, 1997) noted that a better-prepared coach produces better-prepared athletes and when "developing relationships with like-minded sport science experts, you can really move yourself along the continuum of acquiring the requisite skills to become a world-class coach" (p. 7). This type of delivery requires careful integration of strategies into the training plan that is done neither too quickly or slowly for the most effective results (Patrick, 2001). In the end, an effective service delivery model is one that promotes and utilizes IC, which is characterized by discipline-specific assessments with some sharing and synthesizing of information across disciplines.

Ray (1998) has described IC as an integrated approach where members of a team actively coordinate services across disciplines in a holistic way. Differentiation between multidisciplinary and interdisciplinary approaches is based on the amount of information sharing, the number of disciplines involved in the decision-making, and the roles of each member. Where, a multidisciplinary approach might include several members from different fields (e.g., sport psychology, physiotherapy, strength training, and a coach) each discipline works separately and distinctly apart from each other with the same athlete or team. An

interdisciplinary team made up of the same members work together as a group with each athlete because the integration of information from more than one subdiscipline of sport science is required in an interdisciplinary team from the outset. The relationships amongst team members must be stronger than in multidisciplinary teams for this to occur. Ray has also argued that IC allows sheds more information on a particular topic, provides different perspectives, and hence produces a deeper understanding of the situation. With these insights and relationships from all disciplines, it is suggested that IC teams are better able to view the athlete as a whole person. Thus, can be of considerably greater value when intervening to help athletes reach their fullest potential.

This form of collaboration has been implemented in several healthcare fields, such as stroke rehabilitation and geriatrics. In healthcare, an IC model included implementation and evaluation activities that were often independent, occurred within discipline settings (Powell & Sable, 2001), and had goals that were discipline-specific, with an attempt to incorporate other discipline goals where possible (Orelove & Sobsey, 1996). In this setting, a hierarchical system of information sharing existed so that caregivers commonly only shared information upwards. Accordingly, this method required professionals to create and utilize a model of collaborative practice distinct to the setting in which they operated (Powell & Sable, 2001). Success of this "helping model" was dependent on the establishment of a cooperative working relationship among the members involved (Curtis & Fine, 1984) in order to work together while adhering to the established hierarchy.

Hierarchical models of collaboration are widespread in all professions but they are not the whole reality of collaboration (Ede & Lunsford, 1990). In sport, service delivery has encompassed a more "team based" model of collaboration involving athletes, coaches, and sport practitioners (Gowan, Botterill, & Blimkie, 1979; Smith & Norris, 2000; Whitby, 2001). For example, Hardy and Parfitt (1994) presented a model of collaboration that was focused on "equal expertise", which emphasized the collaborative contributions of all parties. This model stated that the perceived needs of both athletes and coaches were responded to more effectively by assuming that "athletes and coaches both bring their own very valuable experiences and expertise to bear upon the problems that they face" (p.133). When all members are more integrally involved in developing problem-solving strategies, they are more personally invested in the chosen alternative and are more likely to see that the idea is implemented (Curtis & Fine, 1984). As all members (sport scientists, athletes and coaches) are encouraged to work together and share information to solve problems, PETs have adopted an equal expertise or team-based model rather than the hierarchical model observed in healthcare.

The need for a collaborative model in sport (such as PETs) stems directly from the four dimensions of performance: (a) technical (techniques/skills to be learned, mastered and executed); (b) tactical (plans, routines, and strategies to create, maintain and safeguard performance); (c) physiological (conditioning of the body, muscles, and energy systems required for sustained effort); and (d) psychological (composure and mental skills training) (Gould & Damarjian, 1998; Hardy, Jones, & Gould, 1996; Hogg, 1995). Development and stabilization of these

performance dimensions must occur to achieve mastery and reliability of performance. To better understand how these dimensions affect performance, Gould, Guinan, Greenleaf, Medbery, and Peterson recorded athletes' thoughts after the Atlanta Olympic Summer Games (1999). Teams that failed to meet performance expectations stated "too much emphasis was placed on the mechanical and physical aspects of performance, while the 'human' aspect of performance and mental training were ignored" (p. 379). Conversely, teams that met or exceeded performance expectations reported that they approached preparation and performance from a holistic, well-rounded perspective by consciously and deliberately working on attitude, cohesion, mental preparation, fitness, nutrition, strength training, acclimatization, and enjoyment.

There are many examples of disparate approaches to enhancing sport performance, where one area may be overemphasized at the expense of another. For example, a sport psychologist may focus too much on psychological states (Gould, 2000) such as improving concentration or managing anxiety and although this may be the presenting issue, other life issues are often involved (nutritional, social, or physical) that might even become the central concern, but go unmanaged (Van Raalte & Andersen, 1996). Because athletic performance does not occur in a vacuum, sport service providers need to collaborate to avoid the mistake of focusing only on one or two dimensions of performance. Likewise, no single aspect of performance can be credited for the success of an athlete, and no single sports science discipline is more responsible for successful performance

than any other, leading the way for an interdisciplinary approach to be utilized to achieve optimum performance (Goldsmith, 2000).

With the development of the CSCs there are more opportunities for sport science professionals from different disciplines to collaborate on performance enhancing programs, through PETs, involving athletes and coaches at an elite level. Potentially, exploring how collaboration is used on PETs to improve athletic performance could provide significant information, particularly in Canada where the pressure to perform well at the 2010 Olympics is already mounting. Additionally, understanding the PET model could help sport scientists become more integrated in all sport science areas and keep a more holistic view of the athlete. To better understand PETs as a model of interdisciplinary service delivery, an exploratory study was designed and conducted. This paper attempts to illuminate who was on the team, critical support factors and the developmental stages of PETs relative to years working together. Three development stages of PETs are ultimately identified and recommendations for improving PETs are put forth. Since the literature on collaborative teams in sport is very new, potential contributions arising from this paper should be viewed as a starting point for future inquiries.

## Method

### *Participants*

Participants for this study were chosen using a purposive sampling technique (Schloss & Smith, 1999), which involves selecting participants based on informational considerations with the purpose to maximize information, not to

facilitate generalization (Lincoln & Guba, 1985). The participants were members from one of three Canadian Sport Centres (CSCs) as a coach or service provider for a total of 13 participants. The service providers were from several professions including sport medicine, nutrition, sport psychology, strength training, physiology, and physiotherapy.

*Data Collection*

Data collection for this study involved four different methods: interviewing, non-participant observation, field notes, and document analysis. Semi-structured interviews were selected for this study because as Smith (1995) noted, semi-structured interviews are particularly useful in order to gain a detailed picture of a participant's beliefs, perceptions, or accounts, about a particular topic. The interviews were transcribed verbatim to ensure the content was intact as relayed in the interview, then, the content was used for analysis. An interview guide was used to indicate the general area of interest and to provide cues when the participant had difficulties answering the questions, but the respondent was allowed a strong role in determining how the interview proceeded (Smith). All PET members were interviewed at least once, with some members interviewed up to three times. Observation consists of gathering impressions of the surrounding environment through all relevant human faculties; thus, the researcher actively witnesses the phenomena they are studying in action (Adler & Adler, 2000). The researcher observed interactions among PET members, in dyads, triads, or groups as determined by daily routines. These observations took place at two of the three CSCs involving two PETs over a combined period of two weeks. Field notes were

kept while making observations and interviewing to provide an expanded account of the observations (Bogdewic, 1992). This aided the researcher in remembering key events or behaviors. Documents were used, if available, to corroborate, confirm, or raise questions about observations or interview statements and were useful for making inferences about events. Documents also highlighted any organizational structures that inhibited or directed the participants in the PET meetings.

*Data Analysis*

Analysis was set into motion with the first site visit as initial ideas or themes were recorded as field notes. A systematic pattern of data collection-analysis-collection-analysis took place, as some of the data was analyzed before all the data collection had occurred. In the process, the researcher analyzed, interpreted, and made sense of the data while attempting to capture the richness of the themes that emerged rather than reducing the data to preconceived concepts or categories (Seidman, 1998; Smith, 1995). Since qualitative studies ultimately aim to describe and explain a pattern of relationships, an inductive analysis was performed on the data. Strategies to enhance and maintain rigor took place during the actual conduct of the study itself. As recommended by Creswell (1998), the researcher engaged in the following strategies: (a) awareness of data saturation; (b) peer debriefing; (c) data/analytic triangulation; and (d) consideration of reflexivity.

## Results and Discussion

This study set out to capture the nature of PETs from the perspective of those who constitute the PETs and to learn about the PET development process. In

doing so, several key factors emerged as central to PET functioning: team composition (including team size & member characteristics), team cohesion, the coach (including roles, education & expectations), and PET support factors (such as centralization & shared philosophy). After a discussion of these factors, the PETs studied are described at three different stages of development focusing on the process of service delivery.

*Team Composition*

*Team size.* Research on team size is considerable, but the findings are not conclusive in recommending a best size for team functioning (Katzenbach & Smith, 1993; Nieva, Fleishman, & Reick, 1985). It appears that team size is contingent on the task and the environment in which the team operates. On PETs, the task was to assist in the preparation of elite athletes' training in discipline specific areas (e.g., sport psychology, physiology). The majority of this work was done in one-on-one settings with the athletes. Thus, team size was not a consideration for the completion of the task. However, team size could be important in creating an environment where shared observations, common goals, and collaboration are valued. Creating an open, trusting environment is often more difficult as team size increases, but results from the literature varied based on the characteristics of the team members.

In this study an association appeared to exist between team size and team formation. The smallest team contained two members and was the newest among the teams studied (two years in operation). The largest team included eight members who have been together for the longest time period (nine years in

operation). The third team had three members who have been together for six years.

Each of these teams is referred to as S1, S2, and S3. Participants within each group are in turn referred to as P1, P2, and P3. The formation of the PETs was largely dictated by the CSCs financial situation, qualifications of available members, and the needs of the coach or sport. Typically, as more financial resources and qualified members became available, individuals were added to the team as necessary. A common finding among these three PETs was that one of the first members was the physiologist. This may be a direct result of the similarity of the discipline to the coaches' own knowledge and the ease with the coach can assimilate these areas into training programs. The next members were either the SPC or the strength and conditioning expert. Team formation continued with the inclusion of the SPC or strength and conditioning trainer (whichever was missing) and the nutritionist, with physical therapy, medical physicians, and biomechanists becoming involved only on highly funded teams. When services in these outside areas were needed and the experts were not part of the PET, the athletes sought out these consultants individually.

*Member characteristics*. There is substantial research in the area of team composition and personality traits. The majority of this research focused on the "Big Five" personality traits and how they affected team function (See Barrick & Mount, 1991). The present research considered member characteristics more broadly in that the participants themselves highlighted the characteristics and abilities that members had, and needed, in order to be successful on a PET.

Member characteristics were similar among all three teams and have been categorized together for ease of discussion. The characteristics included (a) a common vision, (b) openness to new ideas, (c) respect for others, (d) unique qualifications, and (e) communication and interpersonal skills.

The first category was a common vision. Participants talked about having the "same mind" and "striving for the same goal" (P6, S1). This aspect has been extensively documented in past research as important for team composition and team cohesion (Carron, Collins, Whitby, & Stevens, 2002). In establishing this common vision, it appeared essential that team members had an unselfish attitude. For example, many participants mentioned that not taking, or wanting to take, credit for results was crucial in agreeing to a team philosophy.

The second category was openness, which is very similar to the "Big Five" trait of Openness to Experience and Intellect (Norman, 1963). Participants stressed the importance of not taking comments personally and being comfortable in both sharing observations and having someone offer information outside of their own discipline. Respect played a role in allowing openness to occur. If members valued the disciplines involved, then sharing observations became easier. This respect could also have played a part in obtaining "true professionalism", as one member (P1, S2) termed it. If everyone was open to hearing new ideas from other valued disciplines, then the program could get stronger. Although respect is often earned over time, it can be related to the qualifications of the members on the team. The PETs in this study operated under an equal status system, which was designed for all members to make

contributions to the program, therefore, all members needed to be seen and treated as equals. Yet, it was still up to the members to demonstrate the skill sets needed to collaborate and function on the team, earning respect from team members. Learning and understanding other areas/disciplines on the PET helped members respect each other's contributions and facilitated an equal expertise model.

A few less experienced consultants were members on the PETs studied and the experienced participants had similar ideas about how these new members should behave in order to earn respect. The first was an understanding of scope of practice, particularly by those who came directly from an undergraduate or graduate program onto the PET. "The younger professionals need to be humble and cognizant that they don't have all the answers. So often these young members falsely believe that they are experts in their areas simply because they have their degree" (P1, S2). Many participants identified this as a dangerous conclusion because it precluded the opportunity to be "open and interacting with other members" (P7, S1). So, being uniquely qualified for the PET not only included academic knowledge, in an area of expertise, but also the applied knowledge in their area of expertise and knowledge of the applications of other disciplines. Also, many participants felt that these inexperienced members seem to have a "harder time with opinions, by taking comments too personally and being defensive" (P8, S1). It seems intuitive that inexperienced members didn't necessarily come unto the PET with the same qualifications that longer serving members possessed. By interacting with team members, the new service providers

could learn to be open and respectful of other disciplines – developing the experiential knowledge required of them.

Sharing information in an effective manner relied on the communication skills of the members. Being able to listen and not judge, being comfortable giving opinions, and sharing observations were some of the identified skills needed by PET members. Along with communicating effectively, interpersonal relationships formed by the members were also significant. Positive relationships within the team opened communication and a willingness to contribute knowledge and observations. Since PETs relied on shared information, interactions among the members were vital. These interactions were more likely with strong interpersonal relationships among team members.

*Team Cohesion*

Cohesion is an outcome that results when a team works well together, both in completing the task (task cohesion) and in interpersonal relationships (social cohesion). Team composition plays an important role in whether a team is cohesive and to what degree (Barrick, Stewart, Neubert, & Mount, 1998). Research supports that an interacting team that is close in proximity can increase cohesion as well as establishing effective communication and group norms (Carron & Hausenblas, 1998; Corrigan, Lickey, Campion, & Rashid, 2000). In a similar vein, research on work teams concluded that the longer a team is together, the more efficient communication and coordination becomes, and with each members knowledge becoming more accessible to others, an increase in team performance occurs (Choi, 2002). As the PET discussed performance detriments

both a priori and after a poor performance, problem-solving processes were the keys to finding effective solutions. On this point, a participant shared this view: "I think there is more discussion about stuff than in the past, but perhaps partly because of comfort level and partly just because people [were] less intimidated by the other members" (P5, S1). It was likely that cohesion, particularly social cohesion, effected communication and vice versa, which is central for interdisciplinary teams that rely on shared information from all members. A team member also discussed his/her thoughts on the relationships among members; "I think that having a relationship with each service provider helps them to be able to say [to the athlete], this may be something you want to talk about with X" (P2, S1).

In addition, team stability (the length of time members of the PET we together as a team) can impact perceptions of cohesiveness because the longer members of a team are together, the more opportunities there are to interact, resulting in higher levels of cohesion (Stevens, 2002). Research in sport and exercise supports the notion that the more cohesive a group becomes the less likely members will choose to leave (e.g., Spink & Carron, 1993). The results from this study seem to support these findings; the longer the PET had been together, the more clarity there was around "what kind of feeling we want on the team" (P4, S1) reducing the likelihood that members would want to leave the team increasing team stability. One participant stated: "I think that's where it goes back to the importance of who is part of the team because you want people that are inherently of the same mind" (P4, S1), highlighting the necessity of a common vision/goal.

Researchers also assessed the relationship between cohesion and a group's resistance to disruption. Brawley, Widmeyer, and Carron (1988) discovered that groups higher in cohesion exhibited a higher resistance to disruption than teams with lower cohesion. On the PETs, members who have been together longer had less difficulty maintaining their scope of practice and didn't "step on [each others] toes" (P3, S1) as often. For instance, "young professionals really have to be careful about scope of practice; they typically come in and start throwing out a lot of strong statements, whereas experienced members know that most areas are grey" (P1, S1). Further, this participant (P1, S1) highlighted the importance of cohesion during a highly disruptive experience - the Olympics:

> *as a support team, you're working sixteen, eighteen hours a day, for fourteen days, things can get pretty darn intense. It is great to have a PET [where] everybody understands that, and you don't have to go through all the - you know, there's Joe; I've got to stop and talk to him. Everybody knows and everybody's on the same page.*

On the PETs studied, team cohesion was an outcome of team interactions that were influenced by both team composition (member characteristics) and team stability (length of time together). Both factors can have a direct impact on the performance of the team through communication and interpersonal relationships. Working closely as a unit allowed the entire team to be aware of the individual athletes' needs and their emotional, mental, and physical states for best performance (Botterill & Wilson, 2002).

*The Coach*

The CSCs use, what they term, a "coach driven" philosophy in coordinating the PET that was usually led and organized by the coach. It was the coach that ultimately chose the direction of the program and made any decisions regarding the training program. But, individual PET members still worked in one-on-one settings with the athletes and were experts in their own area of study so, each team member made many of the day-to-day decisions independently. However, all components of the training plan were viewed in light of athlete performance results not just individual assessments (McGovern, 1998). Strong leadership was an important component for an effective PET in order to keep the big picture at the forefront. Discussing what leadership meant to the PET and how the coach fulfilled his/her leadership role on the team was vital.

*Leadership and coach role.* Leadership is a process of influencing individuals to complete goals and the ability to cope with change (Kotter, 1990). On a PET, the coach was the individual who set the goals, drove the vision of the team, managed the team resources, and ultimately decided who was a member of the team. All service providers agreed that it was ultimately the coach who was "responsible for their program" (P2, S2) and should be "leading the PET" (P1, S2). "The coach is basically the overseer of everything for an athlete, and if the coach is not going to do it, then no one else is going to do it" (P5, S1).

When beginning on a PET, the coaches felt intimidated by the experts on the team; "they felt that they were being questioned about how their athletes were doing as opposed to [the service providers] sharing information with them" (P3,

S1). When a PET was in early stages of development, it seemed prudent that the service providers took a "softly" (P1, S3) approach to providing expertise on their training programs. With younger coaches, the team members used a similar approach. For example, the service providers talked with the "coaches and asked [them] what [they] think would be useful, [so], they looked at the sport and highlighted some important things that the coach should think about. Or, they'd ask the coach what do they think is important about their sport" (P1, S3). This facilitative approach was designed to make the coaches more comfortable sharing information with the hope of increasing interaction with PET members, leading to a cohesive group. In doing so, the coaches needed to "include the PET, nurture the PET, have the PET understand them, and them understand the PET; if you don't have that, then it's (collaboration) not going to happen" (P8, S1).

Having experts in the various performance areas can support the training program and facilitate high-level performances. The role of the coach as a resource manager is more important then ever, because to be successful, coaches must manage and coordinate a multitude of resources (Goldsmith, 2000). On the most developed PET, the coach led and organized the formal meetings of the group. This was an opportunity for the coach to get updated on individual athletes and hear suggestions and/or concerns from PET members. "Everything goes through the coach; the coach knows everything about the athletes" (P8, S1). For example, while the strength trainer "might not know what's happening with athlete Y who's got an eating disorder, the coach will. Likewise, the nutritionist

might not know about the interventions the strength trainer is doing, but the coaches will know" (P1, S1). In the formal meetings, the coach

> *...gives an overview and expresses the overall message that all PET members need to uphold. So when an athlete goes to the different members of the team, they hear the same message, it's a consistent feeling amongst all members, [as a result], the athlete feels good in that they get the same consistent message [Subsequently], half of the meeting is the coach updating everyone on performances, and the other half is each member discussing their interactions and progression with the athletes* (P4, S1).

It is not uncommon in certain areas for the experts to lead the program. For example with medical issues, "coaches aren't in the position to make medical decisions about what someone can or can't do; the doctor is, so, there were times when the coach may not be making the call" (P1, S1). On another note, when the coach and the service provider had differing opinions on a course of action, the coach often deferred to his/her judgment because the service provider was considered the expert in that particular area.

> *Ultimately the coach leads the program and if we disagree with the coach on certain things based on our areas, then we say so. When the coach wants to move up the testing and I think that it should be delayed a little bit, I say that. And, if I think that this athlete happens to be fit enough in this area to stop focusing on the dry land as much, then I say that to the coach. The coach either agrees or disagrees and we find a way to go with that. Ultimately the*

*coach has to be knowledgeable enough to trust us with what we say so that it's just not a big disagreement* (P3, S2).

*Knowledge and education.* Although the coaches are seen as the knowledge tree in terms of sports specificity and typically hold a basic understanding of the sciences (Luke, 1995), it is clear that they need to have some requisite knowledge of the other disciplines on the PET to be effective. Collaboration between the coach and the sport scientists presupposes a deep knowledge – on the part of the scientists – of the specific demands of each sport, and an understanding – on the part of the coach – of the specific aspects of the human physiology, sport psychology, or nutrition involved in providing effort in each sport (Cherebetiu, 1980). The coach and sport scientists must communicate effectively by sharing their knowledge in order to provide the best service for the athlete.

Perhaps this was one of the reasons why the PETs studied started out with only a few members (two or three) and added new members over time. It is clear when talking to the PET members that they had strong opinions about the knowledge levels and experience of the coaches who work with a PET:

*The coach needs to be at high levels in most areas in order to deal with PET at high levels. With a knowledgeable coach, they can lead the team and practice independently. Even without us they could operate their program very well. They can lead a meeting because they have knowledge at high levels in many different areas. If you take another coach, who doesn't lead very well, in some cases it's because their knowledge level is too low* (P2, S2).

Another PET member stated,

*An issue in coaching is that they need to be educated in a wide variety of other areas so they can interface with specialists. That is probably why coaches felt intimidated initially, because some of them maybe didn't feel that they had the expertise or any knowledge in a particular area* (P3, S1).

One PET member relayed a story of a young, moderately knowledgeable coach who had just started with a PET. The coach "basically [took our suggestions] and went out and executed them" (P2, S2). There was no discussion or collaboration; the service providers were running the program, as highlighted by this member,

*I was literally writing the training plan and the coach was implementing it. That was a problem; we had to quickly get the reins over to the coach, they need to have the last word. Their program lives or dies on them, so, the coach needs to stand up and take control of these things. That's why the CSCs don't put a full team around a young coach; they must start off slow* (P2, S2).

The coaches needed to understand the terminology or jargon used by the service providers. Although the experts tried to use layman's terms, it often wasn't possible when specifics were needed (e.g., physiotherapy). A coach commented, "when physiotherapists use the proper Latin names, I'll say, which muscle is that and why is that important" (P3, S1). The service providers were not intentionally putting the coach on the spot; they were "trying to give them information. So it was more of an education aspect rather than anything else and a certain level of comfort" (P3, S1).

*Expectations of the coach.* When coaches began on a PET they were often overwhelmed with the expertise and not quite sure what to do. Service providers from various teams suggested ways to help the coach lead more effectively. Firstly, the "coach needs to know that the PET meeting is going to be an opportunity for specialists in each area to bring up critical issues about individual athletes that are going to affect their performance" (P1, S1). The coaches should

> *be told what they need to get out of the meetings because [the PET members] are really looking to them to run the meeting and the truth is that if they drag on and on, people are just not going to want to take it seriously. There needs to be some positive movement forward towards the objectives at the meetings* (P1, S1).

The coach has to be proactive, decide on some schedule for meetings or contact, and come in with an agenda. Consider this example,

> *With one sport, the first year we had one big meeting. Everyone's there, everybody gets optimistic, but it was the last meeting like that we ever had. Two years later, three years later, when we don't qualify, it's clear. People are frustrated in that they were trying to help, but in isolation, and nutritionist would do what she could, but she was only called in on certain settings and really for most of the last year and a half, there wasn't any facilitated dialogue* (P7, S1).

Secondly, the coaches need to have the desire to work with a team of experts, which often means giving up control and being criticized or challenged on training methods. The coaches "have to be secure because they are criticized

regularly. If they think they need to know everything then they are doomed" (P1, S2). "If you don't have that desirability from the coach and they're not buying into your role there or vice versa, then it's not going to happen" (P8, S1). Lastly, the coach was expected to inform the relevant PET members of any training plans or strategies. In one case, the coach didn't give the strength-conditioning expert the periodization plan and the season had already begun. The service provider became frustrated and stated "I need to know what he's doing because I need to plan my workouts accordingly; I rely heavily on a periodized plan" (P3, S2).

These expectations are tied to team cohesion and the working philosophy of the team, "if you have a personality clash that you can't resolve, then you shouldn't be part of that PET because it's disruptive to the whole group" (P8, S1). Overall, there seemed to be expectations placed on the coaches in terms of how to collaborate. These were largely based on the PET members' experiences with other coaches, their personal characteristics, and their practitioner knowledge from working with athletes.

*Team Support Factors*

*Centralization.* A key feature of the PET members in this study was that they worked in close proximity to the athletes' training venue and to each other. Two of the three PETs had their CSC located within a university, which was also where the athletes training venue was located. Both the PET members and the athletes were in close proximity. On the third PET, members worked at the same university, but their CSC was situated in a different location. Although the office space for the CSC was not located near the athletes, the PET members were, so

there was some proximity to each other and the athletes. Not surprisingly, location was a significant aspect with regards to team functioning: "location is important in relation to training venues - being close to the athletes and where they train. If you look around the world everyone is doing it this way" (P2, S2). Realistically, certain sports are more conducive to centralization than others (e.g., speedskating, volleyball, swimming, and fencing). Sports that permit "everyone to train in one place are more beneficial, and if you develop a PET in that location, then it works well, but if it's a sport that's not centralized, it's a real hassle" (P5, S1). However, some cities were small enough to allow quick and easy transportation to any training location. On one PET, a participant noted, "it would be nice if everyone were in the same space; if we all had our offices together, but not all of the training happens there anyway. This city has an advantage that I can get anywhere in 20 minutes" (P1, S2). In yet another PET, a similar sentiment was expressed: "the athletes train dry land in the gym and I'm 15 minutes away. That would be the longest distance away from them. Probably 2-3 days a week I'm in the same area as them, I end up spending a lot of time in many places" (P1, S3). Thus, the PET members viewed location as having a positive impact on accessibility to athletes, communication, and the ability to develop team cohesion through proximity.

Having athletes in close proximity allowed the service providers to check in with them on a regular basis. For example, one service provider acknowledged, "I go to the gym and watch the athletes to see how so-and-so is doing, how things

are going, and just to get their perspectives on what's happening" (P2, S1). One benefit highlighted the importance of proximity for bonding,

> *the coach and athletes begin to ask more questions and that's important for me because I begin to understand their lifestyles and training practices. I can get more information from that [interaction] than a phone call with the coach. I can see what's going on and be involved in it. From the coaches' perspective, they've begun to trust my observations and ask more questions of me. They know I'm understanding why they train the way they do, so I'm becoming one of the team* (P8, S1).

According to a PET member, it was beneficial for the athletes too, from a support and confidence perspective. The athletes knew that the PET members were there, "even though they don't hear [me] yelling to them, they know I'm there encouraging them and that helps remind them of the things we are working on" (P2, S1).

Another advantage was the proximity of the service providers to each other. In most cases the CSCs being housed within a university facilitated this. The universities probably were a key "reason why PET started, because they have the sport science people all together in one place. I think what PET really is, is the professionals coming out of the universities into the CSCs and working with the coach" (P2, S2). Being centralized in a university setting gave us access to "the resources, sciences, dedication, and time it takes to make PET happen" (P8, S1). Furthermore, the coaches may be limited to some degree on who can be part of the PET "because the people that are part of the PET are usually working in the

university area or are part of the programs and have some dealings with the Centre" (P4, S1).

A significant aspect of centralization was the facilitation of formal and informal communication between members. Centralization also promoted the benefits that communication offered to team dynamics: "being in the same space with each other, communicating, we develop relationships, professional and personal, but they are relationships that cut to the chase when we need to cut to the chase" (P8, S1). Another participant believed that

> *effectiveness still comes down to the proximity of where the people are located so then one can have an easier and freer opportunity to actually meet the people in an informal setting to just compare notes on what is happening, as opposed to simply having formal meetings. I would say that it is probably the key thing to having an effective outcome* (P3, S1).

Those face-to-face interactions were deemed more positive and productive than other methods of communication, such as email,

> *I think there are things that you can communicate through email so easily, but you can't always include body language or the intonations that you put with that, and it is such an important part of the relationship between each service provider. Also, trying to get a point across where it may be challenging to try to articulate your thoughts, or maybe it's a difficult subject matter, and I think that in a face-to-face setting, that is much easier to do* (P8, S1).

So far the positive side of centralization has been highlighted, but there were cautions put forth by the PET members. One major concern was using the

informal times inefficiently. It could be viewed as a waste of time, which was very precious to the team members. Informal meetings were a "hindrance in the sense that if you are available or present, you have to be careful that you're not just meeting for the sake of meeting. Do we have a reason why we're meeting; is there a purpose behind this?" (P8, S1). It could be argued that without centralization the service providers might be more productive. When this question was posed, a participant's answer was two-fold,

> *First, the only thing [that the scenario] doesn't offer is the informal shooting the breeze time with the coach and it is important and needs to happen because we aren't all in the same place: Informal impromptu discussion happens when you are there. Secondly, they can be useless; we tend to ruminate about the same stuff over and over. If we're not careful the time we spend interacting is not that focused* (P1, S2).

Overall, the PET members strongly suggested a centralized location that was both close in proximity to the athletes and to other PET members.

*Shared philosophy.* Having a shared philosophy has already been highlighted as an important characteristic for PETs that facilitated team cohesion. Yet, having a shared philosophy from a larger perspective supported ongoing team functions. A specific shared philosophy that was common to all PETs in this study was an "athlete-centered" focus to the program: "everything is about the athlete; it's not about you" (P8, S1). This was a philosophy that promoted viewing the athlete as a whole person, "not just from our individual areas" (P3, S1). If the members were athlete focused they weren't "taking ownership of the athletes' performances or

wanting the athlete to be dependent on them" (P8, S1). This unselfish attitude had a positive effect on team cohesion,

> *It's much easier to work with a group when nobody takes the credit, as soon as you have people on a PET who want to take the credit for what happens, then, you start to run into trouble. As long as everybody's there for unselfish reasons, then it will just go* (P3, S1).

As discussed under coach expectations, the coach developed the PET philosophy and upheld its integrity. In a PET meeting that I observed, the coaches reminded the team of the overall message they were trying to uphold by clarifying their approach to dealing with athlete complaints,

> *we just [wanted] to give the feedback to the athletes [in a] tough love [approach] as opposed to coddling them and giving them too much of an ear to complain, thus, reinforcing the negative side of what was bothering them, rather than listening to it, empathizing, but saying okay, what are you going to do about it? We want people that are inherently of the same mind as we are, so that it's not as much of a worry, and it's not as hard to [follow through] because everyone just understands* (P4, S1).

In support of this approach, a service provider stated "I really feel that when we're all on the same page, and have the same understanding, we respect each other and we treat each other as equals" (P2, S1). This feeling of equality, as mentioned earlier, facilitated communication, openness, and aided in team cohesion.

> *In summary, consensus is taking the coaches' vision and having everyone agree on the method - how it's delivered. If the coach wants an athlete to think*

*about things and to work hard to find an answer and I come along and give them the answer, I'm not helping the coach develop a critical thinking athlete; we don't have a consistent style or philosophy* (P1, S2).

Displaying a shared philosophy was also important between PET members. It wasn't uncommon for two members to be delivering similar programs so, using the same guidelines was vital for effective delivery and understanding from the athlete's point of view. For example,

*even though the physiologist may have made the guidelines on fueling, the strength conditioning specialist might deliver them because they see the athlete more often or they are with the athletes at the times when fueling is an issue. So it's the physiologists' area, but the strength conditioner is the one delivering it* (P3, S2).

In order to provide a common message, members needed to know what each other were doing to some degree.

Just because the PETs' goal was to endorse a shared philosophy, it didn't necessarily mean that the message was perceived to be the same among all PET members, thus, delivering that message could cause conflict.

*To suggest that we're always going to share the same message with so many professionals involved, I don't think is realistic. For example, if we are trying to create independent athletes, then everyone has to reflect on what that means to them. It means asking athletes questions, as opposed to giving them the information all the time. So, if the athlete asks a question, ask them what they think, get them thinking about it. We want to respect some of those things and*

*make decisions upon some agreed-upon principles that are based in terms of how we would like to do our practice* (P1, S2).

When conflict or opposing visions were present, these were addressed as a team; "we have a team meeting and we said, this is how we want things to be done" (P4, S1). When athletes experienced a mixed message, the team needed to discuss it right away because the athletes would often take advantage of the split, to reduce their own responsibility in training. They knew they could "get away with it" with certain members and in the long run that wasn't delivering an effective program. Take for example responsibility, athletes will often not book appointments with service providers when they need to, particularly when an injury has occurred;

*You tend to get a picture of athlete responsibility in terms of the type of things that need to be taken care of and whether they actually follow up or not. Then, a member of the PET has to track that athlete and say, book this, book that, you need to do this, or you need to do that* (P3, S1).

Accordingly, part of the shared philosophy was that the athletes needed to take accountability for their actions.

*For the most part, the athlete is the one who has to make up their own mind about how they want to do something. They're the ones that have met with the different referent professionals. They're the ones who are going to have to put it all together* (P1, S2).

In summary, "PETs benefit the athletes, [by] creating that environment where you have a successful unit of people that are going to give the athletes the best

chance of success" (P1, S1). This environment was strongly supported by having and maintaining a unified philosophy with the coach, among members, and within the chosen method of service delivery.

*PET Service Delivery*

The PETs are, by design, a method to deliver services to coaches and athletes, following a team-based model (Gowan et al., 1979; Smith & Norris, 2000; Whitby, 2001). As mentioned, all PET members worked individually with athletes in their area of expertise and then shared important observations with each other, including the coach. Therefore, the athlete, service provider, or coach could recommend services be undertaken. For example, individual sport psychology sessions occurred when either a player sought out the aid of the psychologist or when a member of the coaching staff believed that an athlete's performance difficulties were frustrating enough (Gardner, 1995). Regardless of who initiated service, sharing information with other PET members could occur without diminishing any professional responsibilities to the athlete (Perna, Neyer, Murphy, Ogilvie, & Murphy, 1995).

This research found that service delivery varied based on the development level of the PET. This was likely related to team composition, team cohesion, and the knowledge level of the coach as previously discussed. Specific service delivery results will be discussed using the metaphor of infant developmental stages; the PET will be examined from rolling over (youngest PET, 2 years), crawling (middle PET, 6 years) and walking (most experienced PET, 9 years).

*Rolling over.* The youngest PET studied had been in existence for two years, with two full-time members (physiologist & strength trainer). Additional members provided services in an educational format, such as group presentations or one-off individual sessions with the athletes. The main reasons for this delivery method were based on availability of qualified personnel, financial constraints on the CSC, and the knowledge level of the coach. Coaches at lower competitive levels might have different needs (Gardner, 1995) and may not be prepared for ongoing expertise services. This was also true when PETs and coaches were inexperienced with collaboration. Typically coaches with less experience in IC were coaching "developmental or training groups" at the CSC, yet had PETs working with them in some way. These groups consisted of high performance athletes that were "on the bubble" of making the national team. With these "development groups, the sessions are educational [and the focus is] on good training and recovery practices or fitness testing. What the coaches receive in addition are consultations on training programs and how they execute those programs" (P2, S3). Another PET member that worked with this type of team recalled that the developmental groups received educational services at the coaches' request, which increased the knowledge base of both the coach and the athletes and helped facilitate collaboration.

> *That's why I'm working with [this coach], I think he knows the benefits of some of the [service] areas, but to get all these individual professionals in, it's just never going to happen. That's okay at this level, as long as the athletes are*

*getting some information about all these different areas. As they get higher up into their development, then it happens* (P2, S1).

The PETs at this development stage were more expert driven, which seemed to be a common occurrence as the PETs developed. In particular, on one PET the SPC recalled running the program when their PET was just becoming established, largely because she had the facilitation skills to do the job. In the beginning, "I didn't even know what we were going to talk about, I just said let's get together, and now the coaches are running them, which is great. I think that's some of the transition that needs to happen" (P2, S1). This youngest PET was "not there yet; it's more individual initiative still. We haven't been meeting on a regular basis, but more case by case. So, getting into a monthly meeting hasn't happened yet" (P2, S3). In summary, this early stage of development of the PET was more expert-driven, less collaborative, and less structured than the later stages.

*Crawling.* The second PET studied had been together for approximately six years and had three full-time members (physiologist, strength trainer, & SPC). On this PET, the SPC included monitoring and facilitating group discussion as one of his key roles on the PET. Gardner (1995) concurred, supporting that the team psychologist can have an active role in promoting team chemistry by being a catalyst for effective communication between team members. Also, research in sport psychology demonstrates that the psychologist must effectively communicate to members of the sports medicine team, coaches, and athletes (Wiese & Weiss, 1987). This allows athletic trainers, coaches, physicians and even teammates to recognize both expected and extreme psychological reactions

to areas of concern. In addition, as shown by the PETs studied, regular feedback between members enhanced the credibility of the individual members and further developed trusting relationships.

This PET used educational formats less often than the rolling PET because the coaches had a higher knowledge base and were able to work more effectively with the experts. However, educational formats were still used with developmental groups, but were delivered by students who were mentored by PET members. These students were not involved on a regular basis and were not considered members of the PET. On the other hand, the PET members did need to display more sport specific knowledge:

> *When a sport science person gives a seminar it is one-sided. When he says, here's how we use this - the coach and athlete think that this is the way to do it, but [what] they don't get from the professional is how to make it work in their specific sport. They are not able to use the information based on a generic presentation. So, there is knowledge being shared, but there is no practice or mastery of what is being shared* (P2, S2).

The system that was in use with this PET involved three stages: knowledge, practice and mastery. If a person needed to learn how to use a "heart rate monitor or an accelerometer to properly pace themselves, then the service provider needs to be there for all three stages rather than saying here's a heart rate monitor and some information, usually, that doesn't benefit anyone" (P2, S2). A similar approach was taken in sport psychology, "the more often I'm around, the more opportunity I have to engage in some psychological development, or the more

contact I have with the coach, the more discussions we've had about performance" (P1, S2). Using this system also aided the coach in acquiring discipline specific knowledge and practice in collaboration.

On this PET, collaboration in both formal and informal settings occurred more frequently between the coach and team members, "I think it is always ongoing, I think it should be formalized at the same time I think it can be informal, it should be both" (P2, S2). In more formal settings, the PET planned to meet approximately every six to eight weeks as a group:

> *We've done more regular meetings in the past [with more] structure to them. I find that because it's the start of the quadrennial I think things have been a little bit loose in getting going. We just finally had a good meeting, so, I find there's an evolving nature to this stuff. I'd love to say that we meet every two weeks and it was always this way, but it's just that sometimes it comes together well and then I think we get a little bit busy and we lose sight of the vision. I was saying to the coach, 'guys, come on, let's go, we're not meeting enough'. So, it's kind of complicated in that sense* (P1, S2).

Another member reflected on how their team developed, "we started off very formal, meeting once a month, we had very grandiose ideas, which I think are great ideas, we just don't have the time and personnel to develop things like a file for each athlete" (P2, S2). When they did meet "we talked about certain athletes and their issues, but there's usually no agenda" (P3, S2). In informal settings,

> *the coach and I will talk and sometimes he'll say, I want you to talk with us a bit about this, and then I want you to be around to help follow up with it to*

*make sure that we're working with it well. Alternatively, sometimes the coach and I will talk and I might say, I think you need to try this; you might get some value out of it* (P1, S2).

Informal settings occurred as service providers connected over coffee, lunch, or in the hallways. In these settings conversations happened around PET issues or concerns such as a short update on a particular athlete or what's been happening in a specific area. This type of impromptu meeting happened frequently and became one of the main types of communication between members. PET services were also delivered in individual settings as described previously,

*Sometimes it's just individual athlete stuff where the athlete might come and meet with me, and the stuff that we're talking about, it's really between the athlete and the sport psychologist. We try to say to the athlete, have you talked to the coach about this, and sometimes they'd just rather have somebody to chat a little about it, it's not necessarily really important in terms of their [performance]. But if something's bugging them about school and this and that, they don't really want to get into it with the coach, they just need some help in sorting out some of these ideas. So that would be a moment where it's not really collaborative, it's just the athlete and the sport psychologist doing what they do in the manner that the professional would like to do it in* (P1, S2).

Overall, it seemed that this PET struggled to find a balance between a formal structure and informal collaboration. A member concurred, "very informal now is where we stand now, I think we've gotten too far away; we need to be more formal" (P2, S2). They were more formal and coach driven than the younger PET,

but not yet fully developed in terms of meeting structure. So, "a lot depends on the service provider's philosophy and on how the service provider is related to the CSC in terms of their professional practice and their professional realities" (P1, S2). Experience with the CSC and on the PET could help stabilize this balance, "we learn our practice through experience - we have people with ten to fifteen years experience and a couple with two to three years experience. So, experience dictates how these individuals function in the [collaborative process]" (P1, S2).

*Walking.* The third PET had been together for the longest period of time (nine years) and operated under a similar approach to that of the crawling PET. This group of seven (nutritionist, SPCs, strength trainer, physiologist, physical therapist, and physician) displayed the most collaboration between coaches and members with regular structured meetings and informal discussions. In the formal meetings, the PET met as a group for a few hours to discuss the training program and the athletes' progress, "we try to meet once every six to eight weeks, [but] it depends on what part of the season it is. We'll meet more frequently as we're gearing up for a season, then its once a month throughout the season" (P8, S1). Even when traveling "we meet every day. We see each other every single day, stay in the same motel and eat meals together" (P8, S1). In a pre-Olympic year the PET met more frequently than during the Olympic year itself in order to work out as many problems as possible before qualifying began.

The main purpose of their PET meetings was "to find out what's happening in each area and to get the specific feedback on what that member's opinion is on

issues of concern" (P4, S1). The coaches came into the meeting with the agenda or a list of things they wanted to cover. For example,

> *the meetings are half [the coaches] updating everyone on where we see everyone at, what performances have been like, just in a general way what people are like in a training camp or if we haven't seen them for a while. The other half of the meeting is each person of the team saying what their interactions have been with various people and how they're progressing, whether it is an injury, diet, or sport psychology issues* (P4, S1).

All members made a significant contribution to the meeting as this coach acknowledged, "the real team part is that everyone shares what's going on in their own areas. We don't always cover everybody. I would say mostly it is areas of concern, but, we talk about positive things too" (P4, S1). Another participant affirmed a similar viewpoint,

> *generally the team discusses where we are in terms of performance, how the athletes are feeling, physically and emotionally, all those kinds of things. Then, we'll often break it down to the individual athletes and have a briefing where the coach reads the synopsis of what's going on. He'll go around the table to see if anybody has anything to add to that, then we briefly discuss the athlete, any action that needs to be taken, and then we move on to the next athlete* (P8, S1).

In addition, there were discussions about logistics, such as, who's traveling, when are they traveling, how are the athletes that aren't traveling are being managed and the like.

The meetings often had a sense of collaboration where members shared information about athletes that may not have been important in isolation, but when other members became aware of it, the information made sense. For example, a member may

> *say something that I'm thinking too or that my senses were aware of. Maybe an athlete's tired, or something's going on, and it's subtle; it's not in your face. Sometimes you can't even quite capture what it is, or sometimes you can, but you're not really sure how to put it into perspective. So at the PET meetings, we can do that. If there are any of those inklings, you can throw them out there and see what comes of it; sometimes they're big things. I think the biggest part is that it's almost like you try to head things off before they ever happen* (P8, S1).

For effective PET meetings it was vital that each member knew what to share and what wasn't important to share. This capability resulted from experience on the PET, knowledge of all disciplines involved, and high team cohesion. A PET member reflected on the importance of sharing information,

> *I don't necessarily know about all the injuries that are happening, nor do I necessarily need to know, although sometimes it might be very helpful. Last year we were hearing that there were a lot of groin injuries happening. Once we heard that from the various members (e.g., physiotherapists, massage therapists), then we came up with a new strategy and as a group we thought about some things that might be causing it* (P2, S1).

But, when PET members couldn't make a scheduled meeting, the information was passed to the coach to be relayed at the meeting and then the coach made the decision whether the information needed to be shared or not, so "the most important thing is that the coach has the information" (P8, S1). Overall, the members agreed that it was "beneficial to see faces and to know what each person's up to and catch up, but the content and the direction of the meeting can become more problematic [because of it]" (P1, S1).

Informal sessions happened on a daily basis between members and occurred as each member accessed the training venues or had hallway conversations with other PET members. This was similar in nature to the crawling PET and how they experienced impromptu meetings, which was where some significant information was shared. For instance, one PET member stated, "I see the coaches once a week. I don't necessarily see them for an hour, but I see them at practice and I say, 'how's so-and-so doing, and they're trying to do this, they told me about your meeting', so it's quite quick and informal" (P2, S1).

With this PET, even when sessions were planned with the athletes, it was common for members to quickly adjust to accommodate athlete needs by collaborating with other members. A participant shared a story that illustrated this point; there was a sport psychology session scheduled for athletes returning from competition, but when

> *I ran into a few of them in the hallways they were totally exhausted, fatigued and jet-lagged, so, rather than going in and trying to do something in sport psychology, I just walked by the physiologists' office and said 'have you got a*

*few minutes, can you come down for our meeting'. The athletes were totally preoccupied with fatigue and what they've got to do to recover, so it's pointless for me to try and do something else if that's their priority. He came to the meeting, and in about twenty minutes he provided some excellent advice on how to recover as effectively as possible. I added my comments from a psychological point of view and then we got around for the last twenty minutes to the things we originally had in mind. To me, it would have been totally a waste of time to proceed with what I thought the team needed from a one-discipline point of view* (P7, S1).

This might have been accomplished due to the strong interactions that existed and the trust developed between those members over the nine years in order for another member to take over a session.

## Summary and Conclusion

Overall, the PETs experienced similar growing pains as they developed over the years. In general, the PETs studied differed as they developed in both composition and team functioning. The more experienced a team seemed more effective perhaps due to the stability, cohesion, and processes adopted as team members became more familiar with each other. This finding has also been reported in healthcare where one team found that over time they became much more efficient and effective in assessing their clients' conditions and planning appropriate interventions (Memmott, Marett, Bott, & Duke, 2000). Adding members to a PET was largely dependent on the availability of qualified members, the financial situation of that specific CSC, and the experience level of

the coach. This was particularly evident on the rolling and crawling PETs where they would have liked to involve more service providers, but had these limitations in place.

In terms of team functions, with an increase in team composition came a more interdisciplinary approach. This required a more structured communication system, moving from a largely informal system to the use of more formal meetings. In doing so the PET met more often, had specific agendas, and more collaboration among members. The more the members communicated the more they felt that the meetings were becoming interdisciplinary.

Because the PETs strive to be coach-led, as the team grew and became more structured, the coach had greater responsibilities. Therefore, the coach must have the experience levels needed for effective collaboration and an understanding of the various disciplines involved in the PET. As coaches became more comfortable with the PET, the team became more coach-led and interdisciplinary. The coach began to trust the PET as experts in their own field and it was just enough for the coach to bring up any concerns to the members. Multiple sources of input were not only necessary for good decisions about the athlete, but the experience of coming together benefited team functioning. Many members felt they became a lot more tuned in to what was happening in the program and what might make a difference. In addition, the coaches received interdisciplinary insight on what might to the athletes. Once the team became more coach-led, they displayed more on-going communication, less reporting of activities, and more information sharing between disciplines, thus, increasing collaboration.

When considering the PETs separately as they were during the course of this research, some unique processes existed. With the rolling PET it was obvious that the team was expert-led and the coaches role was to request the services they needed. Due to the level of coach experience and knowledge, the service providers were not able to turn over those responsibilities to the coach. The service providers on this PET did display the same level of shared roles that the most experienced team was enacting. I believe that this was partly due to the similar backgrounds of the disciplines of these members. Members of the crawling PET were clearly working towards a collaborative model that the PET members themselves had outlined and were putting into practice. No other team had formally outlined the model of collaboration that they wanted to utilize. This team was also unique in that they were establishing the boundaries of shared roles and testing these for agreement. With smaller numbers on the PET, it might be beneficial to understand the shared roles and the boundaries that exist in the roles before the team size increases. Admittedly, they were still struggling to balance the formal and informal communication structures, perhaps due to the members allowing the coach to lead the team and learning how to do that in the process. The walking PET was unique in that they had the most experience, stability of members over a longer duration then the other PETs and processes that has been in place for several years. The unique concerns that stemmed from this PET were the issues of information sharing and ensuring that all members were kept up-to-date on PET functions. Logistically this team required and had a strong coach who led the team of experts in a well-organized way. In order for this to occur,

informal conversations took on more significance and became an integral part of communicating observations and insights.

All three PETs could relate to the developmental stages each team underwent and all strove for the highest level of efficiency and functioning. But, the reality of the Canadian sport is that some CSCs will have more financial constraints than others and will need to do the best they can with what they have. It may always be an ongoing process that requires team members to continually search for ways to collaborate with the resources they have.

*Future Research*

Literature on collaborative teams in sport is very new and our understanding of its potential contributions is in its infancy. The findings of this study relative to team composition, the role of the coach, team cohesion, support factors, and service delivery should be viewed as a starting point rather than an end point. There is still a great deal to learn regarding the operations of the PET, with the challenge of not making it sound more grandiose than it is. As one participant remarked "I think that there's probably a little bit too much rhetoric written about PETs making it into something more than it probably is. There's a lot of hot air of how a PET team works, but in reality, it is really specialists dealing in their area and communicating" (P3, S1). Yet, there are unique features to the PET that need closer attention, such as dealing with shared information, power structures (equal expertise), and overlapping boundaries (role distinction).

With healthcare moving away from multidisciplinary models to more interdisciplinary approaches there will be a great to deal to discover about team

functioning from that field, which could be applicable in sport. Further, the nature of interdisciplinary teams is to share information and make team decisions, therefore, understanding how, when, and what information should be shared could impact performance results and will be essential questions for future studies. It will also be imperative to continue to understand these teams from the recipients point of view, thus, further studies may wish to include the athletes' point of view on whether they perceive the same performance benefits as the PET members.

Finally, researchers need to enhance ties with practitioners in order to develop and study performance related questions. Working on a PET will undoubtedly lead to questions regarding performance enhancement that will need to be answered. Also, sharing knowledge about best practices is invaluable to provide quality services to athletes. One service provider shared this frustration, "I don't think people understand what the PET is or what it could do. I was trying to implement systems that are associated with best practice found in Australia and Germany. But, a lot of people don't even know what those are" (P1, S2).

This study highlights IC in sport, and furthers our understanding of PETs. This type of team (PET) is not new, and many versions of it exist throughout the world. In Canada, the CSCs have found something that works in terms of the athlete-oriented meetings but the problem is there are no guidelines to follow in establishing similar teams, leaving many sports to figure it out on their own. The findings of this study are a starting place to develop and implement suggestions for developing, using, and maintaining PETs, with further research to follow.

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# CHAPTER 5: EXAMINING INTERDISCIPLINARY COLLABORATION: A HOLISTIC APPROACH TO PERFORMANCE ENHANCEMENT

Chapter four set the background for PETs by describing the composition of the teams and comparing the PETs at different development levels. The Chapter concluded with an overall summary of the PETs and suggestions for future research, one of which was to explore the process of collaboration in more detail. This next Chapter undertakes a more extensive examination of the use of IC, specifically how collaboration occurred and what processes were used.

A number of scholars in sport psychology have advocated the use of collaboration among sport scientists (Feltz, 1992; Gordin & Henschen, 1989; Hanin, 1999; Hardy, Jones, & Gould, 1996; Landers, 1981; McCann, 2001). However, as Weiss (1998) suggested, while many continue to advocate this need, it has not been carried out, which might also explain the lack of research focused in the area. Collaboration has been described as the "coming together of diverse interests and people to achieve a common purpose via interactions, information sharing, and the coordination of activities" (Jassawalla & Sashittal, 1998, p. 239). Collaboration has commonly encompassed individuals or teams from cross–professional disciplines including members from the same or different organizations (Amabile, Patterson, Mueller, & Wojcik, 2001).

Collaboration across disciplines has been termed both "multidisciplinary" and "interdisciplinary" (Burwitz, Moore, & Wilkinson, 1994; Memmott, Marett, Bott, & Duke, 2000; Ray, 1998) and has roots in the health care system. Differentiation between multidisciplinary and interdisciplinary approaches is based on the amount of information sharing, the number of disciplines involved in the

decision-making, and the roles of each individual. For example, a multidisciplinary approach would include several members from different fields (e.g., sport psychologist, massage therapist, biomechanist and a coach) who work separately and distinctly apart from each other with the same client. An interdisciplinary team, however, could have the same members from several different fields that work together as a group on behalf of their client. Further, when using an interdisciplinary approach, the relationship between members would have to be much stronger, as the integration of information from more than one subdiscipline of sport science is required from the outset.

In healthcare, interdisciplinary collaboration (IC) has been described as an integrated approach in which members of a clinic actively coordinate care and services across disciplines. Powell and Sable (2001) stated that collaboration across disciplines offered the best opportunity for a holistic approach to meet the complex needs of individuals, where team success was indicated by progress toward achieving the goals of collaboration, effective team functioning, and achieving benefits for the individual members involved in the collaboration (Amabile et al., 2001). These healthcare teams usually come together for some specific purpose, fulfill that purpose, and then disband. In fact, health care professionals probably spend much more time engaged in multidisciplinary functions than in interdisciplinary functions (Ray, 1998).

In sport, it has been recommended that IC be adopted (Anshel, 1997; Dishman, 1990; Gould, 1982; Morgan, 1989; Newell, 1990). Specifically, Morgan (1989) argued that sport psychology researchers were the "most isolated of the isolates"

(p.107) and stated that it was not possible for any individual, operating from the perspective of a given discipline, to even raise correct questions much less be able to answer them. Consequently, the transition to an interdisciplinary team requires the various disciplines to understand each other; signifying that they have some shared borders. Steps need to be taken to have an effective and efficient team working for the well-being of the athlete (Collins, Moore, Mitchell, & Alpress, 1999).

To understand how IC could be used effectively in sport, consider the case of an injured athlete (Burwitz et al., 1994): the physiologist and the biomechanist might consider the combined effect of fatigue and technique changes on the injury; the psychologist and biomechanist might evaluate the relationship between attention and technique and their additive effect on the injury; and the physiologist and SPC might consider the effect of the interaction of fatigue and arousal on the injury. In order to investigate, all three scientists operate with synergy throughout in an effort to integrate their expertise. Thus, IC could provide additional information that would not normally be available if a multidisciplinary approach was employed. Because of this type of information sharing, IC could decrease the occurrence of half-truths (Mills, 1996). For instance, a recommendation may seem appropriate from one discipline, but might only be a half-truth when information from other disciplines are considered (Botterill & Wilson, 2002). As team members consider insights from all disciplines they are better able to view the athlete holistically. IC could be of considerably greater value when intervening to help athletes reach their fullest potential by taking into

account physical, emotional, and mental fitness. As a result, IC considers the additive relationships between many variables from different subdisciplines within sport science.

Philosophically, IC must include the coach because s/he is seen as the knowledge tree in terms of sports specificity and typically holds a basic understanding of the sciences (Luke, 1995). The coach has expertise in the specific demands of each sport and the sport scientists have expertise in the specific aspects of human and sport physiology, sport psychology, or nutrition required for each sport (Cherebetiu, 1980). The coach and the sport scientists must effectively communicate and share their knowledge in order to provide the best service for the athlete. In doing so, the sport scientists must have input into the yearly and quadrennial plans and meet regularly with the coach on at least a weekly to monthly basis (Robertson, 1997). Interactions with all service providers and regular meetings of the whole group are necessary in order to maintain a clear direction. This type of delivery requires a carefully planned integration in the early training plans. Hence, working in a collaborative setting requires a careful balance between self-management and collaboration by all involved, in order for athletes, coaches, and sport scientists to learn as a result of cooperation and communication (Patrick, 2002).

The need for this type of service delivery requires professionals to create and utilize models of collaborative practice distinct to the setting in which they operate (Powell & Sable, 2001). One service delivery model, Performance Enhancement Teams (PETs), utilizes IC and has been described by Smith and

Norris (2000). Basically, PETs include professionals from various sport disciplines who work together to provide both athletes and coaches with practical sport science information that allows them to train and work to their highest potential. These teams are located in the Canadian Sport Centres (CSCs) that are dispersed across Canada. The services provided by the PET effectively assist in tying together the various components of the coaches' yearly plan (McGovern, 1998). PET members have input into the yearly plans and meet with the coach on a regular basis, typically every four to six weeks. The result is a service delivery model that promotes and utilizes IC and is characterized by discipline-specific assessments with some sharing and synthesizing of information across disciplines.

Interdisciplinary collaboration has been viewed as critical in order to maximize the potential for international success for elite athletes (Patrick, 2001). Since training athletes to reach maximum levels of performance cannot be achieved by only one person, regardless of level of competence, the coach will need the help of other specialists to establish close collaboration in the scientific management of sports training (Cherebetiu, 1980). In fact, talent and effort are often not fully effective without the assistance of several specialists to direct the training program from the biological, technical and psychological point of view (Cherebetiu, 1980). In order to develop an understanding of how IC was used in sport, the purpose of this paper was to examine the use of IC among PET members; highlighting how IC occurs, what information was shared, and how confidentiality was addressed. Developing an understanding of how IC was put into practice could have important consequences for future sport teams who wish

to adopt this approach. Also, learning about the process of information sharing could highlight what knowledge was essential and what wasn't in terms of athlete performance. All of this knowledge can lead sport scientists to adopt more effective delivery practices by using IC.

## Method

### *Participants*

Participants for this study were chosen using a purposive sampling technique (Schloss & Smith, 1999), which involves selecting participants based on informational considerations with the purpose to maximize information, not to facilitate generalization (Lincoln & Guba, 1985). The participants were members from one of three Canadian Sport Centres (CSCs) as a coach or service provider for a total of 13 participants. The service providers were from several professions including sport medicine, nutrition, sport psychology, strength training, physiology, and physiotherapy.

### *Data Collection*

Data collection for this study involved four different methods: interviewing, non-participant observation, field notes, and document analysis. Semi-structured interviews were selected for this study because as Smith (1995) noted, semi-structured interviews are particularly useful in order to gain a detailed picture of a participant's beliefs, perceptions, or accounts, about a particular topic. The interviews were transcribed verbatim to ensure the content was intact as relayed in the interview, then, the content was used for analysis. An interview guide was used to indicate the general area of interest and to provide cues when the

participant had difficulties answering the questions, but the respondent was allowed a strong role in determining how the interview proceeded (Smith). All PET members were interviewed at least once, with some members interviewed up to three times. Observation consists of gathering impressions of the surrounding environment through all relevant human faculties; thus, the researcher actively witnesses the phenomena they are studying in action (Adler & Adler, 2000). The researcher observed interactions among PET members, in dyads, triads, or groups as determined by daily routines. These observations took place at two of the three CSCs involving two PETs over a combined period of two weeks. Field notes were kept while making observations and interviewing to provide an expanded account of the observations (Bogdewic, 1992). This aided the researcher in remembering key events or behaviors. Documents were used, if available, to corroborate, confirm, or raise questions about observations or interview statements and were useful for making inferences about events. Documents also highlighted any organizational structures that inhibited or directed the participants in the PET meetings.

*Data Analysis*

Analysis was set into motion with the first site visit as initial ideas or themes were recorded as field notes. A systematic pattern of data collection-analysis-collection-analysis took place, as some of the data was analyzed before all the data collection had occurred. In the process, the researcher analyzed, interpreted, and made sense of the data while attempting to capture the richness of the themes that emerged rather than reducing the data to preconceived concepts or categories

(Seidman, 1998; Smith, 1995). Since qualitative studies ultimately aim to describe and explain a pattern of relationships, an inductive analysis was performed on the data. As part of the coding process Participants are referred to from this point forward as P1, P2, and P3. Strategies to enhance and maintain rigor took place during the actual conduct of the study itself. As recommended by Creswell (1998), the researcher engaged in the following strategies: (a) awareness of data saturation; (b) peer debriefing; (c) data/analytic triangulation; and (d) consideration of reflexivity.

## Results and Discussion

Several methods to communicate observations and share information were used to study PETs including group or interpersonal communication in both formal and informal settings (Espinosa, Lerch, & Kraut, 2004). Formal settings involved meetings and sharing documents, while informal settings involved encounters in public places such as water coolers and hallways (Kraut & Streeter, 1995). Formal meetings with the entire PET occurred approximately every four to six weeks depending on the team and the need for such meetings. Another formal method used was one-on-one meetings, which usually occurred between one service provider and the coach. In addition, there were times when meetings occurred in dyads or triads with the coach. Additionally, PET members met in informal settings, such as at the training venues, over coffee, or in hallways. These informal meetings were often spontaneous, yet permitted opportunities to discuss various aspects of athletes' training. Finally, alternative forms of

communication were used in conjunction with face-to-face meetings and typically included phone calls or emails.

Having opportunities to communicate was not enough to ensure that information sharing took place. Other factors, such as what information to share, contextual intelligence (Brown, Gould, & Foster, 2005), and professional guidelines of confidentiality affected the depth and quality of the interactions. Team members offered insights into how information sharing transpired and the factors related to effective collaboration during this research process; these factors are discussed below.

*Team Meetings*

Group meetings were developed because "we needed a forum to communicate with each other about the athletes" (P1). The meetings provided a venue for all PET members to collaborate on the training program. Generally, when the PET met they discussed what was happening in each area and acquired specific feedback from each member of the group. The team meetings typically occurred every six weeks depending on the competitive schedule of the sport and were managed by the coach.

In the ideal situation, the coaches entered the meeting with "a list of things they wanted to cover and they updated [the PET] on where everyone was at, what performances had been like, or what people were like in training" (P4). The coach would "go around the table to see if anybody had anything to add; we briefly discussed that athlete and any action that needed to be taken, then, we moved on to the next athlete" (P3). In addition, there were discussions about logistics, such

as who was traveling, when they were traveling, and how the athletes that weren't traveling were being managed.

Although the meetings appeared to be time consuming, not every athlete was covered. The meeting was usually focused on areas of concern, but they also "talked about positive things too, so it wasn't always a damage control thing" (P4). A nutritionist supported this view, "I provided insight from my end as to what I was seeing regarding their nutritional intake and if things were going well I also reinforced that" (P6). A strength trainer expected the "coaches to give them a summary of where they were in the season [such as] what they were doing in training and the direction they were heading, but it wasn't an opportunity to go into micro detail about what each person's going to do" (P1). If it was something little, the members would send each other an email about it; "we do that by default because we don't want to waste each other's time" (P1). More specifically, in a meeting that I observed, the coach stated "training's going well, we just got out of a very heavy block, we're getting ready for world cups in four weeks, then we've got this trial coming up so we're really gearing towards this" (P1). It was more of a general overview with an opportunity to talk about the big picture, but the main focus of the overall meeting was still on each individual athlete. When the meeting concluded, the members "walked away a lot more tuned into what was happening in the program and what might make a difference. The coaches went away with a load of interdisciplinary insight on what might happen" (P7).

*One-on-one Meetings*

When the members were not collaborating as a group they met in one-on-one settings. These meetings occurred mostly between individual PET members and the coach and it provided an opportunity for more detailed information in each specific area to be discussed along with personal or confidential information about the athlete. For example, the strength trainer would "sit down with the coach and review the periodization plan, the physiologist will sit down and go over the whole picture and then the coach would resource each individual to use him/her where they're needed" (P1). In nutrition, the coach "wanted to do some nutritional assessments during the competition phase to see how different they ate during that [phase] and what they were lacking" (P4), so an individual meeting was arranged to discuss how that would happen. Some members met with the coach for a short session following the PET meeting to discuss any action items in more detail. One member elaborated, "after the meeting I might sit down with the coach and talk a bit more about the injury from my perspective, but I don't need to sit down with everybody" (P2). Another member suggested that when "you have detail-oriented issues like what you're going to be doing on a whole, it's best done with the coach and whoever else needs to be there" (P1). On another occasion, the coach initiated a meeting with the SPC to debrief a training camp. The SPC wanted "to get the inside scoop because the athletes were coming and talking to her about it, so she needed to know from my perspective what was happening" (P2).

Individual meetings with the coach also occurred in informal settings such as the training venue where short debriefings took place on specific athletes. Sometimes the athletes "came in saying I'm really tired, I can't train anymore. So I talked to the coach and found out that this guy's kind of a whiner, or they have some issues at work, and some family problems" (P5). On newly developed PETs, the service providers "met with the coach [separately] to collaborate, as opposed to the coach coming to the PET meeting" (P13). In this case, the service providers utilized one-on-one meetings as the main venue for discussion. From one members' view, the most important part of the one-on-one meetings was that the coach "collaborated with them as opposed to the coach saying this is what I think we should be doing. I think it was much more effective because they were a huge part of the team and they have been through certain things that I haven't" (P2).

When issues and concerns needed to be addressed in groups crossing different disciplines, the coach would hold meetings with small groups. A SPC agreed, "most problems have … primary disciplines that are involved and then secondary ones" (P7). A common grouping included the strength trainer, the physical therapist, and the coach. The physical therapist applauded these group meetings; "the strength trainer and the coach met with me in regards to injuries because there's no need for everybody to be meeting for that discussion" (P8). Although these meetings excluded many members, the information was brought back to the whole team at the next PET meeting. This allowed other members to have an opportunity to add feedback and observations on the issues.

*Informal Meetings*

The group, one-on-one, and subgroup meetings were the most structured and formal methods of communicating among the PET. Nonetheless, informal meetings happened frequently and were regarded with equal importance. Informal meetings occurred as service providers connected over coffee, lunch, or in the hallways and conversed about PET issues or concerns. Some members made connections with regularity, as this SPC explained, "I don't think [this one member] ever touched email because he was just too busy so … he'd come by for a tea and we would just informally connect at least a couple of times a week" (P7). Other members sought out quick conversations at the training venues. For example, "during a training period I can touch base and see if we need to meet more, [particularly] if I hear of issues" (P2).

A strength trainer suggested that coming regularly to practice, talking about issues, and following up on actions made a difference to the athletes and the program. This type of impromptu meeting was a key form of communication between members. "I would say that informal conversations are a typical scenario, and it is based on the premise that the [members] make the effort to interact with the other people in an informal setting" (P3). In these gatherings information was "picked up that was not necessarily given in a formal setting, and it allowed you to have a bigger picture of the whole athlete" (P3).

Informal meetings were highly dependent on the location of the service providers. "If you're not in the same building then the likelihood that you're going to meet people other than in a formal situation is a barrier" (P3). With close

proximity the members had "an easier and freer opportunity to actually meet … to just compare notes on what was happening. It is probably the key to actually having an effective outcome" (P3). Location was also important in relation to training venues, according to one physiologist; "it is important to be close to the athletes and where they train [because] this is where some of the most interesting ideas and conversations take place. The so-called virtual teams don't have the benefit of hallway chats or discussions [at the training venue]" (P10). A strength trainer agreed suggesting that:

> *if you talk only at meetings or in emails, there's a formality to it that makes it hard to get quite as much out of it. There's no doubt in my mind that the informal thing is best if you are close enough to take advantage of it* (P11).

Although informal meetings were extolled by the members, a SPC cautioned that, "impromptu discussions can be useless if we ruminate about the same stuff over and over. If we're not careful the time we spend interacting is not that focused" (P9). Overall, informal conversations were prevalent among PET members, which led to some beneficial outcomes. For instance, when a SPC, a physiologist, and a strength trainer all visited the training venue frequently, it fostered a meaningful and strong relationship between those members. Also, the informal conversations allowed the members to "touch base, get on the same page, and hash out issues" (P11), so that when they discussed the issues in the formal meetings they "already had conversations on that [issue] and it was just a matter of decision-making" (P11).

*Alternative Methods of Communication*

Communication between members wasn't always face-to-face; they often used email and phone calls to update members of the PET on specific issues. A coach suggested, "you don't need to have a physical meeting too often because general updates can be done in specific areas through emails or phone calls" (P4). The members "don't necessarily have to respond, … but they're aware of [the issues] because they get [copied on the] e-mails" (P4). Through this form of communication, all team members, regardless of their location, stayed current on athlete and program concerns.

Most PET members made a point to update each other on the specifics of individual athletes and program results. In one case, the first thing the physiologist did after a meeting with a coach or athlete was call the strength trainer to discuss key points and ask for feedback or comments. A strength trainer stated:

> *if I know that [an athlete] has gone through a nutrition assessment, then it makes my job better in that I apply what I know. I may not need to know all the details, but if I know enough or get frequent communication with that professional, or what I know has happened with their presentation, then it's going to make my area better* (P11).

From a medical perspective, a physician said:

> *If I see an athlete for an update on the concussion, I'll call the coach up and email everybody who's kind of relevant to the problem, and I'll say, look, I saw so-and-so and I think she seems to be getting better, but it's not completely resolved and we need to continue to do this or this, and I usually try to give a time-line to when I expect things to come around* (P5).

In response, the physical trainer then communicated any training restrictions to the group. These simplified examples illustrate how effective communication using electronic methods played a role in how the team functioned.

In addition to phone calls and e-mails, several PETs were implementing web-based communication systems. For example, one team was looking to "invest in an on-line or web-based injury tracking/communication tool. That way, even when you're on the road it allows for sharing of information, not only on specific athletes, but also just as a communication tool as well" (P5). Another PET was starting an online forum referred to as sportweb.

> *We have 3 training centres and all the physiologists communicate on the program together because we need to do similar programs. The coordination of services must be integrated and at the same standard across the country. This tool allows us to login and look at each athletes files and updating can be done from anywhere* (P12).

A SPC had a vision of web-based communication becoming the norm, especially with video capabilities. "We're going to have athletes with their laptops overseas clicking up getting the support staff on their computers … and they're going to be

interacting dynamically with the performer" (P7). Further, he suggested that the PET members

> *should start to pattern activities and in a way that eventually will lead to that kind of dialogue because you're going to end up with the chance to have a pretty personal dialogue with people by looking them in the eye and seeing their expression and dialoguing with performers who may be anywhere in the world* (P7).

Although technology may provide new and innovative ways to stay informed, the PET members voiced a preference for the physical meetings. One member stated, "no doubt, we have technology we should use to our advantage … [by] improving our coordination and communication even though people are spread out, [but] I still have a preference for face-to-face meetings" (P9). Another member suggested that the benefits of personal contact outweighed technology stating that, "it's easier to interact and respond with everyone there listening. You can get a lot more information exchanged in an accurate and quicker way than if you tried to do it with one phone call to this person, one to another, or e-mails" (P4). Regardless of the method of communication, the members' priority was still to share relevant information with the team in the most efficient way available to them at the time.

*Key Factors to IC*

Although the methods of communication are varied, the team members stressed that the content of the meetings was more important than the way it was communicated. Having an understanding of all disciplines involved in the training

program and the jargon used by various team members was essential for effective communication. Once other disciplines were understood, knowing what information to share became easier. This shared information was vital in the collaborative process and ultimately to the training program of the athletes.

*Sharing information.* One of the most significant features of IC involved information sharing amongst team members. Effective collaboration went beyond communicating actions in one given area to an educational element, specifically, communicating observations, both within and outside of a given area of expertise. PET members needed to help each discipline understand their area of expertise for information sharing to be meaningful. If one discipline didn't know what information was noteworthy from another disciplines' perspective, then the knowledge of what was vital to share became problematic.

As outlined previously, the PET used formal meetings to get an overview of what happened in each area. The meetings were also an opportunity for members to share information that might be essential for the team to hear. "Everything isn't on the table, just things that are going to be useful for everyone to be aware of and know" (P4). The team members often went around the table and asked, "What do you see that we should talk about"? If an athlete had a specific problem "you have the nutritionist, the physiologist, and the psychologist all there, then the coach starts to hear everything they need to hear to try and improve it" (P7). On one PET, this very scenario occurred:

> *there seemed to be a lot of groin injuries happening, and once we heard that from [several members], we came up with a new strategy, and as a group we*

*all brought some ideas and thought about some things that might be causing it* (P7).

Another example from a SPC supported the benefit of receiving information from all disciplines,

*...the physiotherapist says 'right now this is where they are in their training', so when an athlete comes in and says 'I'm tired', I go, good, you're supposed to be tired, that's what the training program is supposed to do right now, in two weeks you're going to feel different, if I don't have that information, I might think, maybe [the athlete] is getting under recovered. So, it might be very general information, but it can still help in the process of each of our areas (P2).*

Overall, the impact of information from one area had direct implications for others. Another example provided by a nutritionist demonstrated the usefulness of information sharing,

*if the strength trainer has the athletes trying to build muscle mass, I can take a look and see how many calories an athlete is eating; is it enough to support their training goals. Or, the physiologist might say, 'we saw an athlete who has low iron' and I can look at their nutrition and say 'you're right', their diet is very low in iron and it's not a surprise to see that in the blood work* (P6).

Thus, consistent observations from other disciplines allowed team members to confirm that they were making similar assessments of a situation. With positive relationships among members, discussions about athletes or situations yielded significant knowledge.

Although information sharing seems easy to implement, in actuality it was very challenging because each member had different ideas about what needed to be shared. A physical therapist wanted to know, "anything to do with the musculoskeletal system if that's part of my professional skill set…" (P8). A physiologist would like to know "anything that impairs performance, physiological or otherwise" (P10). This knowledge doesn't guarantee that all information will be shared. Most SPCs were cautious about their ability to share information, "the only person that I share information with is the coach, … if an athlete is struggling with something specifically, then, I would say [something to] the physio, massage, or doctor." (P2). When I probed this member further to ascertain what information had been shared in the past, this example was offered:

> *a concussion affects everybody and everybody has a bit of an input, so the physiologist can say, for every week he's out, it's going to take a month for him to get back. From my perspective, we need to help support [the athlete] through that because if he thinks he's coming back next week, ten weeks later, that's pretty tough on an athlete. So, sometimes it is specifics that we can all have that impact on* (P2).

Additionally, when an athlete chooses to share or divulge information to one PET member whose expertise was outside of the issue, many team members felt that it was that individual's responsibility to direct the athlete to the appropriate expert and explain why it was important to see the expert. There was an expectation that the individual would follow up with that expert to inform them of the athlete's concerns.

As alluded to above, sharing information involved a great deal more than just reporting on progress. It also entailed a willingness to share observations about the athletes that might be important to other team members. A member might say something that triggered another member to think about the issue in a new light. Without communication between the experts, a service provider could exacerbate the problem. For example, a strength trainer explained:

> *when someone has a weak back I'd train their back. But from a physiotherapy perspective, often a weak back can be a result of something else and by training the back you might exacerbate the problem. So, now I don't know what the issue might be; I just tell the physio I've noticed this in this way, can you follow up with the [athlete] in the clinic because I don't know exactly what's going on [sharing observations] works really well because I get informed and that's important because I need to know about [certain issues]. So, ... I take that information and I apply it with each individual* (P1).

Getting the information early on in the training program was imperative, as a service provider acknowledged, "if a [problem] rears its ugly head at [the Olympics] that could be the end of it" (P1). Although team members don't necessarily need to know the specifics of each area, they need to share observations on each athlete, even if it's "not a big deal, [they] still need to be aware of it" (P1). Team members used meetings as opportunities to communicate any "inklings they may have and throw them on the table to see what comes out of it" (P8). One member summarized the importance of sharing observations by

suggesting that, "ultimately if we're not sharing, if we're not coming together … then it's lost, or it's not nearly as effective as it could have been otherwise" (P11).

*Contextual intelligence (CI).* PETs worked in collaborative environments that encouraged sharing observations and information. As such, members needed to develop a general awareness and understanding of the other disciplines involved, which could be attained by defining terminology and sharing knowledge about basic practice (Koskie & Freeze, 2000). With PETs this usually took place through team discussions as members shared observations of, and interactions with, individual athletes. As team members became more knowledgeable in other disciplines, they might offer observations and make recommendations in areas other than their own specialization (Koskie & Freeze). This allows for a form of intelligence (CI) that is rarely formally described or taught (Wagner, 1987). As an external, interactive process involving the practical application of knowledge, CI could also include interpretation of nonverbal cues and the use of tacit knowledge (Sternberg, 1985). Factors that were related to CI on interdisciplinary teams included knowledge of language or jargon, an understanding of how the team works, and knowledge of the performance context (Brown et al., 2005).

Of the PETs studied, knowledge of other disciplines was a precursor to sharing observations. When a team member knew what was important from the perspective of another discipline, it was easier to decide what that member needed to hear. For example, if the nutritionist noticed that an athlete was dehydrated, it was important that the physiotherapist was also aware of this because the athlete

might experience muscle cramping. Even understanding the yearly training program from other perspectives was significant to the nutritionist:

> *when the athletes are in a strength or an endurance phase, I need to understand the physiology involved and therefore the nutritional requirements at different times will vary. In regards to the taper [phase] I would look at making sure the athletes are adjusting their dietary volume accordingly and yet consuming optimal nutrition so they're fully recovered in preparation for competition* (P6).

Members tended to look at performance as a sport scientist rather from their own disciplinary perspective; "I might be an expert in physiology, but if I don't understand the basics of psychology how can I interact with that member? If you think about all disciplines; you become more of the sport scientist rather than just a sport physiologist" (P10). Team members acknowledged that they were not going to be the "current professional, but for the team to work well together [they] needed to have some basic understanding of the different inherent disciplines" (P9). In this case, the 'current' professional meant having knowledge of the most recent information and advances in a particular discipline.

A method team members used to learn about the other disciplines included attending presentations given by other members. For example, a strength trainer or physical therapist might attend a presentation given to athletes on a sport psychology topic. This helped them become familiar with the terminology and the practices used by that specific discipline. "I might be there in his talks and I understand what he's talking about, so I know what he's referring to at a different

times, or he's been there through my workouts and he's learned what's gone on [in my field]" (P11). When this knowledge was acquired the members could "talk freely" (P11) to each other, "but that's taken years before we ever came together, and years since we've been together" (P11). This member implies that service providers should be educated early in their careers on all sport science disciplines either formally or through individual initiatives because acquiring knowledge of other areas is an ongoing process.

Knowledge of all disciplines was a starting place for acquiring common terminology and opening communication, specifically with the coach. "To be a successful team, or even an individual within the team, the language style of how one communicates is actually very important" (P3). On the PETs, each member developed a style with which the coach seemed comfortable. For example, the physiologist talked "…about more, less, higher, slower, and without numbers, so it's all a question of the relationship that one has with the coach and what one can then figure out is the best way to then interact with that person." (P4). Most members became skilled at switching back and forth between terms they used with colleagues and terms they used with the coaches. In addition, one member found that many definitions depended on the demands of the sport,

> *the term aerobic power to one person is different for another and what it means on the water is different than what it means on land. It comes back to performance related characteristics and the language they are using day to day. We need to get and use the coaches' terminology more so then they need to understand ours* (P12).

To become familiar with several disciplines, a breadth of education and experience working in multi- or interdisciplinary settings has been suggested by several researchers (Koskie et al., 2000; Mitchell & Crittenden, 2000; Ruddy & Rhee, 2005). One PET member had a different opinion about this stating, "I don't think it's necessary for each person to have a really clear fundamental working knowledge of another person's area. What's necessary is to know enough about what's important for me to follow up on and what's not" (P1).

*Integration of knowledge.* Sharing knowledge is only half of the potential contribution of collaboration within the PET. The other half is demonstrated by the integration of that knowledge into each individual's area of expertise. Once team members had some familiarity with the other disciplines involved on the PET, that knowledge was used regularly in specific programs. For example, with a muscle injury, "the athlete could ride the bike in a straight line, so we could do a lot of maintenance without them actually putting recovery in jeopardy. These are the kinds of things that each person then tried to integrate into their own areas" (P3). In another area, the strength trainers were often in the position to motivate athletes while performing various physical tests. They often found ways to use psychological techniques that were shared by the SPC. "Embracing tips from sport psychology helps me do that more effectively" (P11). This integration indirectly illustrated to the athletes how to integrate mental skills into training situations and reinforced a similar message. In addition, reminders could be given by the strength trainer to reinforce a physiologist's message. For example, if the physiologist had just

*worked specifically with some athletes to teach them how to fuel properly and I happen to be in a workout with them, then I give them the little reminder. Remember what you're supposed to do right now, well now's the time to do it because you've just gone through X amount of extremely difficult exertion and now you've got twenty minutes before you get into the next workout, so now's your optimal time to do your fueling* (P11).

The physical therapist was also able to integrate knowledge and display a unified message to the athletes. For instance, an athlete might complain about something on a massage table, and the typical response might be to "coddle that complaining" (P2). But, if the therapist was able to integrate the SPCs' message, then, the "athlete would be challenged and held responsible for their part in it" (P2). While discussing integration with the SPCs, they seemed very cognizant of the fact that people in general seem to understand the basics of psychology and are interested in the insights in this area, making it relatively easy to integrate. Additionally, when probing about how easy it was to integrate other areas into sport psychology, one member responded, "SPCs are able to integrate into their field very easily. I think it has to do with the openness of sport psychology; there are more ways of knowing in this area that are not accepted in the sciences" (P9).

Not everyone felt that they were integrating knowledge regularly. A physician working with an injured athlete didn't really consider the other disciplines when treating the athlete, "I've never actually worried about that too much. I just basically talk to the coaches, [the athlete] seems ready to go, and carry on with life kind of thing" (P5). Although through our discussion of integrating

knowledge this member admitted that there might be a way to integrate knowledge effectively,

> *I probably need a little enlightenment and discussion if there's a better way to approach sending someone back instead of just saying go for it. I give them guidelines, but I haven't really necessarily worried about the psychological aspect of it for example* (P5).

As demonstrated through the above examples, integrating information plays a large role in how effective the collaborative efforts were.

*Confidentiality*

In counseling, confidentiality is a means to provide the client with safety and privacy. It safeguards personal information from harm, and authorizes the client the right to dispose of information as they see fit (Kell, 1999). When confidences are open to other staff members that may work with the client, a "confidentiality net" should be established (Mearns, 1998). The CSCs have implemented a type of confidentiality net by introducing a PET confidentiality form signed by all members of a particular PET and the athletes using the services of that team. This form allows the PET service providers directly involved in an athlete's care to discuss a particular condition/case/scenario that may be affecting a specific athlete. The type of information discussed was dependent upon the professional code of ethics/guidelines for each practitioner (National Sport Centre Manitoba, 1998). Since the effectiveness of PETs hinge on their ability to efficiently share information and view the athletes holistically, an understanding of what information could be shared was essential. It was hoped that this agreement would

open up dialogue, knowing that any information related to the PET would remain confidential within the group. In other words, sharing information could be maintained without diminishing any professional responsibilities to the athlete. Adherence to this places the PET member in the position of deciding what information would be shared about athletes (Perna, Neyer, Murphy, Ogilvie, & Murphy, 1995).

One member believed that the team was "…disclosing 95% of information, there may be 5% of information that you feel is just not necessary for people to know" (P6). Most service providers agreed that it was up to each professional to decide, "whether information is important to be shared or not" (P13). From the physician's perspective, "the information I share is specific to that problem and nothing else, and I don't share physical data" (P10). In a meeting that I attended, the SPC seemed to keep comments very general in nature. When asked why, she said:

> *I don't think it's everyone's business, all the details around that side of things, I think that is the coach's business. If an athlete is struggling with something specifically then, I would say [something to] their physio, massage, doctor, but I think the coaches are really the ones who need to know as much information as possible* (P2).

Another SPC stated, "I think people really appreciate when we share highlights, but we have a higher responsibility for confidentiality that we need to respect and you have to balance that" (P7).

It wasn't always apparent what information was private and what wasn't. One member suggested that if the information wasn't limiting performance then "the athlete should decide if the information needed to be shared among PET members" (P10). Another member stated,

> *I can think of a couple times when an athlete on the road has said I'd like to speak with you confidentially about something, often right then and there, I'm trying to make this distinction are you talking to me as the physiotherapist or are you speaking to me as a friend, is this a little bit of a blend of both? The challenging part is, because you do become friends, so where do you cross those lines? I can think of where we decided we were discussing in terms of friends and it had nothing to do with sport, but it kind of did. So I let the athlete know that I would likely be bringing this up with the coach and discuss it from there* (P8).

The closeness that seemed to develop between this service provider and the athlete was frequent among members. Friendships could make disclosing information more complicated, but this issue was determined to be beyond the scope of this study and not probed further. The coaches also had to make decisions about confidential information. As one coach stated:

> *occasionally there's stuff that the athletes will talk with us and it's clear - it's either stated or it's implied - that it just stays between the two of us, so it's not like every single thing is on the table. Its just things that are going to be useful for everyone to be aware of, if it's really personal, it doesn't need to be, and*

*sometimes it's just between the coach and the athlete and it will always stay that way* (P4).

The only time this type of information would be brought to a team would be if it affected the other areas, or it might be discussed among only two or three members. "If the athlete has chosen to share something, that maybe somebody else on the team should be dealing with, it's my responsibility to let the athlete know, I think you should be talking to so-and-so about this" (P8).

Many PET members would ask the athlete for permission to share certain facts with the group or coach, although this was most common among the SPCs as reflected by the following comment:

*I wouldn't ever share anything without them giving me permission, obviously. I don't necessarily give details, but I often ask the athlete if it is okay if I let the coach know that we had this conversation because I'm not going to be on the road with you, so if I'm not on the road with you, we need someone else to check-in with you* (P2).

Another stated, "I'll ask for permission somewhere before we're done chatting … . my first preference is that they wouldn't mind [me] talking to the coach" (P9). Other disciplines would simply notify the athletes that they were going to share specific information, "if I see someone I'll often say 'Well, I'm going to talk to the coach and the physio about you and we'll go from there', and the fact that they don't say no, that's consent in of itself" (P5). The longer a team worked with the same athletes, the more comfortable the athletes seemed to be with how information was shared because "the athletes over time will trust what's not going

to get shared, or I'll let them know" (P9). This sentiment was affirmed by another member, "I've gotten more and more to a point with the athletes that I can almost share anything. From their perspective, they want me to, they're very comfortable with that" (P2).

With each discipline deciding separately what information to share, a possibility existed that members might feel they were not getting enough detail to be effective. When questioned on this subject one strength trainer replied,

> *I know that there's more to certain stories that have been held back but I know if it was something physical that would affect my area then I would be told. I know that the only reason it would be held back is that it's a need-to-know basis kind of thing* (P11).

Another strength trainer added,

> *I know there's a lot of stuff that goes on that I don't know about but I feel I know enough to be able to work within the system and work within the group to have optimum impact. The psychologists and physicians [are] very careful and they have mentioned before that it's tough to know how much to say and what to say and what not to say* (P1).

There seemed to be an assumption on the PET's that most information could be shared unless the athlete openly objected. This raises some interesting questions: Is this assumption based on the confidentiality net of the team? What is the effect of this assumption on the athlete? As a past member of a PET I didn't find this assumption overly alarming, however, from a different perspective I wondered if the athletes really bought into this and how they came to trust their

service providers? For example, when athletes are working with a SPC it might be more obvious to the athlete what they felt was confidential and what was not. But what happens when the athlete divulges information on the massage table that is personal in nature, yet related to performance? From my understating of PETs, the massage therapist would suggest the athlete see the SPC about that issue, share that information with the SPC, or do nothing. The answer might involve an issue of expectation, i.e., is there an expectation of confidentiality when working with a SPC that doesn't exist when working with a massage therapist?

Being able to share potentially sensitive information could be related to the amount of trust between team members. When trust is very high a member believed that "you can share almost everything " (P7). The relationship of trust between colleagues protects privacy, encourages responsibility, and leaves communication lines open (Kell, 1999). Also, the CSC confidentiality agreement between PET members and their athletes might ease fears in sharing information. "I think the consent form will help everybody be on the understanding - PET as well as athletes - what goes on and what we do in terms of sharing information" (P5). A similar statement has been echoed in counseling: appropriate boundaries of confidentiality are crucial, but they should be held within the confines of the practice as a whole rather than between counselor and patient (Weiner & Sher, 1998). In my personal experience, if team members trust each other's qualifications, each other's goal of keeping the athlete's best interests at hand, and the team's shared philosophy, then sharing information becomes less risky for all involved.

Overall deciding what information to share was not as easy as it sounds; there were dilemmas that each service provider faced in making those decisions. The most important concern to one member was sharing information that could be helpful, "if they can avoid mistakes, then I'm going to [share] enough to make sure they can do that" (P7). While discussing confidentiality one PET member wondered, "how else are we going to talk about our observations if we don't have the authority to share" (P6)? Another member summarized the issue suitably, "ultimately we have to share some information otherwise no one would ever understand what's going on and you wouldn't be able to get anywhere" (P5). As it stands, team members must use their own code of ethics in determining what information to share and how best to do that, even though these guidelines may be different among team members. However, there is support for this method in healthcare, particularly when considering the type of working environment (Kell, 1999).

## Summary and Conclusion

Interdisciplinary collaboration allows experts in various performance domains to design and implement training programs with the coach, as seen on the PETs. As team members considered insights from all disciplines they were better able to view the athlete holistically. As a result, IC considered the additive relationships between different disciplines within sport science. The result was a service delivery model that promoted and utilized IC and was characterized by sharing and synthesizing information. The significance of IC was highlighted when members remarked how funny it was that a piece of information would not have

come up if they had simply gone through a normal check list and yet that information becomes a very important. Collaboration also allowed the members to make similar assessments of a situation. Sometimes it was the subtle, unimportant pieces of information that had the biggest impact for others.

Collaborating had personal outcomes for the members on the team along with the benefits to the training program. For example, members expressed growing as a professional in terms of accepting criticisms and getting more out of the situation because of the feedback.

There are many reasons to adopt an interdisciplinary collaboration approach and the PET members comments reflect many of the benefits identified in the literature: (a) a heightened awareness and appreciation of one's own discipline (McKenzie, 1999); (b) a broader understanding and enriched respect for other disciplines (Ray, 1998; Schofield & Amodeo, 1999); (c) the opportunity for cooperative research (McKenzie; Schofield & Amodeo); (d) an increased use of different team members to meet a client's varied needs (Ray; Schofield & Amodeo); (e) the offering of greater objectivity; and (f) the development of a mindset for working cooperatively with shared values and attitudes (Ray).

Barriers or concerns about IC have also been acknowledged. The most commonly reported in the literature include: (a) differing status of members leading to unequal benefits of team participation; (b) varying levels of personal commitment among members (Ray; Schofield & Amodeo); (c) usage of dissimilar jargon and technologies; (d) role confusion or the blurring of roles; (e) time commitment - needed or expected (McKenzie; Schofield & Amodeo); (f) fears of

intrusion and the loss of control by members (McKenzie); (g) differences in expectations regarding goals and objectives (Ray); and (h) untrained members in interdisciplinary teamwork (Ray).

Many of these barriers might be resolved with organizational planning and rules for guiding teamwork (See Sundstrom, Demeuse, & Futrell, 1990). The PETs in this study successfully addressed these concerns by demonstrating competence in their own discipline, understanding and respecting how other disciplines approach problems, and using functional communication and group process skills. Mitchell and Crittenden (2000) have acknowledged these as core IC competencies. According to Huang and Perroud (2003), productive collaboration requires a balance of power among team members, knowing the jargon of each discipline, and trusting the expertise that each member brings to the team. The PETs observed in this study demonstrated these characteristics of productive collaboration.

In spite of these successful practices, the study PETs identified areas that could be improved. First, to be effective it was recognized that communication needed to be constantly monitored. Members felt that there was room for more explicit communication because there might be some assumptions being made that shouldn't be. If members were to lose sight of the common goal, or stop communicating effectively, discipline specific needs would possibly influence the decision-making processes. Secondly, students need to learn that applied work requires knowledge in other disciplines. This recommendation has been made by others, suggesting that when students engage in a variety of educational

experiences it leads them to appreciate the value of interdisciplinary teamwork (Mitchell & Crittenden, 2000).

Experience in interdisciplinary settings may also aid students/team members in the understanding of confidentiality. Experts are still left to their own code of ethics when dealing with disclosing information, even though they can be very different. How do the athletes know what guidelines are being followed? From their perspective, the confidentiality agreement might be made more specific. As long as their performance continues to improve it might be possible that the athletes do not even think about confidentiality and information sharing. These are areas that have not been explored in this study. However, since confidentiality is an essential part of IC and effective PETs having a common understanding about what and information can be shared needs to be addressed more carefully by all members of the PET, including the athletes.

In conclusion, for IC to become more prominent each organization must look anew at its leadership roles and the related competencies required to achieve its mission (Waide, 1999). The paramount question that sport organizations must evaluate is whether collaboration will make a substantive difference in serving the organization's primary customers, the athletes? Even though it is impossible to quantify which components of overall athlete development contribute the most to performance excellence, it has been suggested that "we must collaborate to survive" (Mitchell & Crittenden, 2000, p. 3) and conceivably, that includes achieving excellence in sport performance.

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# CHAPTER 6: THE 'GREY' ZONES: SHARING KNOWLEDGE AND BLURRING ROLES ON PETS

Chapter 5 examined of the use of IC by the PETs with a specific focus on how collaboration occurred and what processes were used. The Chapter concluded by uncovering the benefits and barriers of IC as mentioned by the participants and suggesting some ways to improve PET processes. One substantial finding from Chapter 5 involved the integration of information from other disciplines in specific programs. Acquiring knowledge of other disciplines opens the door to grey areas: going beyond integration and actually providing services on behalf of other members. In this Chapter, the management of shared roles, team cognition, and implicit communication are explored. While the grey areas that exist were uncovered, exploring these boundary lines left as many questions as answers and helped to identify new areas for further investigation.

A common notion for teams in both sport and business is the need to have clear and defined roles for the members on the team. Role clarification allows members to know what is expected of them in certain situations, helps them understand the nature of their position in relation to others, and creates clear work assignments (Garner, 1994). Additionally, role definition has been a component of team formation stages since Tuckman's model (1965), resulting in the inclusion of a role defining process as a team building activity to foster team cohesion (Spink & Carron, 1993). However, literature on teams using interdisciplinary approaches has questioned the need for role clarity in some situations. Interdisciplinary approaches are defined in part by the sharing of information among members, the communication structures used, and the

coordination of activities. This approach requires various disciplines to understand each other, signifying that they have some shared borders. For example, in the helping professions, role ambiguity is common because skills and knowledge in the different disciplines overlap (Garner, 1994). Practitioners in these situations, mainly healthcare, frequently take advantage of areas of overlap by assuming duties that might be considered more in the domain of another profession (Drinka & Clark, 2000). This approach removes the belief that certain content matter is necessarily owned by any particular discipline. The goal is to accept multiple perspectives of a problem in order to understand it more fully than if observing it from a single vantage point (Kaufman, Moss, & Osborn, 2003).

Through the process of communicating, team members interact, transforming the collection of individual knowledge to team knowledge (Cooke, Salas, Kiekel, & Bell, 2004). In the field of organizational psychology, this is known as team cognition, which can describe a process (sharing of team-relevant knowledge) or a product (shared mental model) (Fiore & Salas, 2004). Team cognition includes an awareness of who on the team knows what, which is facilitated through communication, then members use this knowledge to guide their coordinated actions (Cannon-Bowers & Salas, 2001). A specific form of team cognition, namely shared mental models (Mohammed & Dumville, 2001), are often used to describe a shared team awareness of all members' tasks and responsibilities (Fiore, Salas, & Cannon-Bowers, 2001). It also includes knowledge of the team members themselves, how they work together, and how the team represents or interprets various issues (Cannon-Bowers, Salas, & Converse, 1993; Stasser,

1992). Therefore, the development of shared mental models represents declarative (knowing what), procedural (knowing how), and strategic (knowing context & application) knowledge.

In order to develop team cognition, team members must engage in communication and coordination that could lead to effective performance (Fiore, Salas, & Cannon-Bowers, 2001). Communication can occur in various forms, but the content should include information from the following four categories (Cannon-Bowers & Salas, 2001): (a) task-specific knowledge (specific procedures, actions and strategies to perform a task); (b) task-related knowledge (what is teamwork, how it operates, its importance); (c) knowledge of teammates; and (d) an awareness of attitudes and beliefs of team members. Task-specific knowledge leads team members to have compatible expectations for performance without having to discuss it, whereas task-related knowledge contributes to the team's ability to accomplish the task. Knowledge of teammates is important because by understanding team members' preferences and tendencies, they can compensate for one another, predict each other's actions, provide information before being asked, and allocate resources according to member expertise. Finally, when members have similar attitudes and beliefs they can arrive at compatible interpretations, which enable them to reach better decisions.

The need for communication is driven by the need to coordinate activities, therefore, coordination is required to manage interdependence with team workflow (integrating different actions together in concert at the appropriate times) and involves integrating team operations in a timely way that achieves

satisfactory performance (Bowers, Braun, & Morgan, 1997). The underlying processes involved in coordination include understanding goals, activities and tasks, individual team members, and interdependencies (Zalesny, Salas, & Prince, 1995).

A construct that has proven useful in understanding the nature of coordinated behavior is the distinction between implicit and explicit coordination (Stout, Cannon-Bowers, Salas, & Milanovich, 1999). Explicit coordination requires that team members communicate to articulate their plans, actions, and responsibilities, whereas implicit coordination describes the ability of team members to act in concert without the need for overt communication. In order for this to be effective, team members must have a shared understanding of the situation and team member responsibilities. Team members gain this shared knowledge by providing each other with the necessary information without having to ask. This knowledge helps members understand what is going on with the task, anticipate what may happen next, and which actions team members are likely to take (Espinosa, Lerch, & Kraut, 2004). As a result, teams can coordinate implicitly without consciously trying through team cognition (Espinosa et al.). Implicit coordination is associated with effective performance if, and only if, team members have an accurate understanding of each other's needs, responsibilities, and expected action, thus, explicit communication may be necessary to build that understanding. In summary, as team members develop experience with the task and interact with each other, they develop team cognition that helps them coordinate implicitly.

Research on team cognition has been plentiful as of late, but typically focuses on 'simulated' work tasks with intact teams (Cannon-Bowers, Oser, & Flanagan, 1998; Gersick & Hackman, 1990; Milliken, Bartel, & Kurtzberg, 2003; Stout et al., 1999). However, interdisciplinary teams that display team cognition and shared mental models also exist in sport and these teams deal with 'real life' problems and issues. These teams are called Performance Enhancement Teams (PETs) and comprise professionals from several different sport science disciplines who use an interdisciplinary approach to deliver services to athletes. PETs are characterized by discipline-specific assessments with some sharing and synthesizing of information across disciplines. The goal of this paper is to describe how team cognition, shared mental models, and defined roles are used on PETs. In doing so, this paper will focus on the shared knowledge among team members (which is conducive to team cognition and implicit coordination), overlapping roles (role ambiguity), and defining scope of practice.

## Method

### *Participants*

Participants for this study were chosen using a purposive sampling technique (Schloss & Smith, 1999), which involves selecting participants based on informational considerations with the purpose to maximize information, not to facilitate generalization (Lincoln & Guba, 1985). The participants were members from one of three Canadian Sport Centres (CSCs) as a coach or service provider for a total of 13 participants. The service providers were from several professions

including sport medicine, nutrition, sport psychology, strength training, physiology, and physiotherapy.

*Data Collection*

Data collection for this study involved four different methods: interviewing, non-participant observation, field notes, and document analysis. Semi-structured interviews were selected for this study because as Smith (1995) noted, semi-structured interviews are particularly useful in order to gain a detailed picture of a participant's beliefs, perceptions, or accounts, about a particular topic. The interviews were transcribed verbatim to ensure the content was intact as relayed in the interview, then, the content was used for analysis. An interview guide was used to indicate the general area of interest and to provide cues when the participant had difficulties answering the questions, but the respondent was allowed a strong role in determining how the interview proceeded (Smith). All PET members were interviewed at least once, with some members interviewed up to three times. Observation consists of gathering impressions of the surrounding environment through all relevant human faculties; thus, the researcher actively witnesses the phenomena they are studying in action (Adler & Adler, 2000). The researcher observed interactions among PET members, in dyads, triads, or groups as determined by daily routines. These observations took place at two of the three CSCs involving two PETs over a combined period of two weeks. Field notes were kept while making observations and interviewing to provide an expanded account of the observations (Bogdewic, 1992). This aided the researcher in remembering key events or behaviors. Documents were used, if available, to corroborate,

confirm, or raise questions about observations or interview statements and were useful for making inferences about events. Documents also highlighted any organizational structures that inhibited or directed the participants in the PET meetings.

*Data Analysis*

Analysis was set into motion with the first site visit as initial ideas or themes were recorded as field notes. A systematic pattern of data collection-analysis-collection-analysis took place, as some of the data was analyzed before all the data collection had occurred. In the process, the researcher analyzed, interpreted, and made sense of the data while attempting to capture the richness of the themes that emerged rather than reducing the data to preconceived concepts or categories (Seidman, 1998; Smith, 1995). Since qualitative studies ultimately aim to describe and explain a pattern of relationships, an inductive analysis was performed on the data. As part of the coding process Participants are referred to from this point forward as P1, P2, and P3. Strategies to enhance and maintain rigor took place during the actual conduct of the study itself. As recommended by Creswell (1998), the researcher engaged in the following strategies: (a) awareness of data saturation; (b) peer debriefing; (c) data/analytic triangulation; and (d) consideration of reflexivity.

## Results and Discussion

Using an interdisciplinary approach required team members to share information with each other in regards to the athletes and their training. This involved information in discipline specific areas and voicing observations from

within and outside of each member's expertise. Primarily, sharing information occurred during the formal meetings of the PET, but private meetings and informal settings were also utilized. Through this communication strategy, team members were engaged in role expansion, which occurs when members acquire sufficient information from other disciplines to make knowledgeable observations and program recommendations outside of his/her discipline (Orelove, 1995). In order for shared information to be understood, members needed to develop a general awareness and understanding of the other disciplines involved, which was attained by defining terminology and sharing knowledge about basic practice, as supported by Koskie and Freeze (2000).

On PETs, this usually took place through team discussions as members shared observations of, and interactions with, individual athletes. Team members also communicated how they approached athletes on certain issues or how they practiced their discipline. This sharing of knowledge allows for a form of contextual intelligence (CI) that is rarely formally described or taught (Wagner, 1987). Thus, CI is an external, interactive process involving the practical application of knowledge, which could include interpretation of nonverbal cues and the use of tacit knowledge (Sternberg, 1985). As team members became more knowledgeable in other disciplines, they offered observations and made recommendations in areas other than their own specialization, which has been supported in research exploring role expansion (Koskie & Freeze, 2000). In doing so, PET members tended to look at performance as sport scientists rather than from their own discipline point of view, supporting the notion that performance is

multidimensional. One PET member commented, "I might not be the current professional, but for the team to work well together [we] needed to have some basic understanding of the different inherent disciplines" (P9). Knowledge of all disciplines was a starting place for acquiring common terminology and opening communication. In fact, current literature suggests that the key factors related to CI on interdisciplinary teams includes knowledge of jargon, an understanding of how the team works, and knowledge of the performance context (Brown, Gould, & Foster, 2005). This CI was vital for meaningful understanding of shared information because that information would be ineffective on a team operating under different philosophies.

Having a similar philosophy allowed PET members to operate with parallel goals that in turn led to information sharing. It wasn't just sharing information that impacted the athletes; it was also giving them a consistent message through service delivery, regardless of discipline. It was "very important that people know what is happening in all areas so at the appropriate time reinforcement can be given, but it's actually the same message" (P3). Displaying this shared philosophy was central to PETs because it was common for two PET members to be delivering similar programs, in which conveying the same message was vital for effective service delivery. For example, a strength trainer and the physiologist may be both delivering information to the athletes about fueling requirements and when to fuel.

*Shared Knowledge*

Sharing information involves common ideas on philosophy, discipline specific knowledge, and observations. In order to have a team working with synergy, knowledge transfer in these three areas needed to take place. One of the keys to successful team functioning on the PETs was having a common philosophy. On the PET, the coaches usually set the vision and requested that service providers practiced their profession in tune with the overall philosophy. For example, over two different meetings that I observed, the coach tried to give an overall attitude that he wanted the PET to uphold. So when the athletes "go to the different members of the team, they hear the same message, it's a consistent feeling amongst all these members, so the athletes feel good and get the same consistent message from everybody" (P4). One member offered a specific example of this message, "if you're working on motivation, then I need to be sending that same message to the athlete through my actions and support the psychological side" (P8). In one case, the SPC confirmed and endorsed the information already given to the athlete, supporting a unified message:

> *I saw the coach's email about how much time off the athlete should take, and knew that the athlete talked to the physiologist. So I said, what did the coach say; what did the physiologist say? I ask myself, is there any reason why I would disagree with the head coach and the sport physiologist? The answer is no, unless I have a really strong feeling that they may be off going down the wrong path* (P9).

Without having the responses from the other disciplines, it is likely that the SPC could give conflicting recommendations. Having a shared philosophy allowed members to trust that others were acting with the same objective and CI aided in the understanding of the jargon and delivery methods in each discipline in order to be consistent.

Sharing knowledge also involved the sharing of discipline specific expertise with other members. One member made a point to share discipline related knowledge that might impact the entire team via electronic mail, "when I find something, I send a note out to everybody and say, this is what we're working on this week with Bob and if anybody has anything they'd like to add or share they can" (P8). Other members have meetings to share expertise and agree on a similar message, "I'll have a conversation with the physiologist around his expectations versus my expectations versus the doctor's expectations of the blood levels for iron. We're just consulting with each other on our own personal opinions" (P6). By engaging in ongoing communication, team members developed shared knowledge of the other members' information requirements. Consequently, team members were eventually able to anticipate those information requirements and communicate information before it was requested (Eccles & Tenenbaum, 2004). For example, if a SPC knew that the strength trainer was working with an athlete on a weak back then, s/he could watch for indicators that would provide feedback on how the back was feeling, such as holding the back or grimacing while using the back muscles.

Perhaps the most difficult aspect of sharing knowledge was being unsure about what to share and with whom. Consider this scenario: an injury has occurred, but the athlete has not followed up with an appointment with the physiotherapist,

> *I'll say, did you see so-and-so, and they'll say, no, should I? Well, yes, and then you have to take action. So, a lot of it is that you start to get a picture of athlete responsibility in terms of when whether it's nutrition, injuries, that type of thing needs to be taken care of, and whether then they actually follow up, if not, then a member of the team has to follow up and say, book this, book that* (P3).

In this case, it was sharing with the physiotherapist that an athlete had an injury that needed to be assessed. In other cases, it was sharing information about their own discipline and how it could be useful while the athlete was working with another member. If an athlete was working on certain exercises with the physiotherapist, then a SPC could share information on a specific mental skill, such as imagery, that could be used while the athlete was performing the exercises. As one SPC suggested, "you don't have to teach the other member how to use imagery, just suggest that it might be helpful in this case" (P2). Sharing information across disciplines can make members aware of issues in their own areas. If an athlete talks about anxiety while on the massage table, then passing that information along to the SPC would be important. "It doesn't help me if no one tells me that on the massage table someone's talking about being anxious and I never hear about it. I can't do anything about it" (P2).

Lastly, shared knowledge was displayed in the form of observations. As team members became knowledgeable about other disciplines, they watched for problems that might be related to other disciplines along with their own. A coach might share an observation with the nutritionist that a particular athlete seemed very inconsistent and their performances were hit and miss. The nutritionist can then share a discipline specific observation such as, "I can see a thousand calorie fluctuation from one day to the next when they record their nutrition, so, I'm not surprised that's why you're seeing inconsistency" (P6). The result of sharing information was a better understanding of what all PET members observed in any performance area. In the end, the ability to interpret observations relied on the level of shared knowledge members had of team operations (MacMillan, Entin, & Serfaty, 2004).

Overall, sharing information made it easier to integrate knowledge from other disciplines easier. For example, the strength trainers were often in the position to motivate athletes while performing various physical tests. They found ways to use psychological techniques that were shared by the SPC. For example, a strength trainer highlighted the following, "embracing tips from sport psychology helps me do that more effectively" (P11). A strength trainer also shared the following,

> *[the physiologist had just finished] working with some athletes to teach them how to fuel properly and I happen to be in a workout with them, then I give them the little reminder. Remember what you're supposed to do right now, well now's the time to do it because you've just gone through X amount of*

*extremely difficult exertion and now you've got twenty minutes before you get into the next workout, so now's your optimal time to do your fueling* (P11).

These examples of knowledge integration support the use of implicit communication described earlier. The strength trainer didn't need to confer with the SPC to implement motivation techniques, or the physiologist to encourage proper fueling. Based on the members' shared knowledge these overlapping roles transpired without being explicitly communicated by others. This mental model involved the comprehension of a situation as the member integrated knowledge and drew inferences about that situation (Espinosa et al., 2004). Wittenbaum and Stasser referred to this as the "synchronization of members' actions based on unspoken assumptions about what others in the group are likely to do" (1996, p. 23). Further, not all knowledge needs to be learnt collectively, some knowledge needs to overlap among various dyads or triads, and all individuals on the team will hold unique knowledge (Stasser, 1991). Thus, all team members will share general team knowledge, but members who interact more regularly than others will share more specific knowledge about each other's operations (Entin & Serfaty, 1999) and each member will have discipline specific knowledge that only they hold.

*Overlapping Boundaries*

PET members shared enough information for them to experience a wealth of shared knowledge. For example, physiologists, strength trainers and physical therapists had areas of knowledge that overlapped, with a similar educational core. A strength trainer relied a great deal on nutrition, and as s/he stated, "as part

of my program I may say take this protein supplement or eat this amount of food during the day" (P1). Also, many SPCs with sport science backgrounds had some expertise in strength training and physical assessments. Further, physiologists and strength trainers shared similar knowledge as the nutritionists in terms of fueling, hydration, and general proper nutrition, and the physiotherapists, physicians and strength trainers shared considerable knowledge/duties when it came to prescribing exercises. For instance, if an athlete had a bad back a strength trainer

> *might be doing certain things that he thinks was helping, meanwhile, the physiotherapist and the physician had a totally different idea on what needed to be done, if [the strength trainer] is not part of that communication he could be doing something that exacerbated the problem* (P1).

With most disciplines sharing a portion of knowledge within each area of expertise, it was important to explore how teams using an interdisciplinary approach handled this amount of shared knowledge.

*Managing shared roles.* One method of managing overlapping roles was to accept the sharing of responsibilities between members. This allowed members to take on shared roles with other team members with the condition that only one member was the primary member in the particular area. In deciding on the sharing of roles, one member suggested that each service provider should make a "judgment on whether they're trained - learnt it through experience and is appropriate - and if we've come to an agreement as a group about how to approach it" (P9). On one PET, an agreement was reached between the physiologist and the strength trainer because they could perform each other's role:

*we've agreed that the physiologist is more the scientific evaluation and will work with the coach on sport demands and complete physical assessments. I could do all the same tasks, but focus on the strength and conditioning aspect - how to improve performance and prevent injury through training. We are pretty easy going and not too protective, so whatever it takes to get the job done* (P13).

In sharing these responsibilities, both members must have a clear understanding of how the ranking member would like the information to be delivered. This reflects back on the consistency of a shared message and a common goal. So, acting on another member's behalf must still be consistent with the team's overall shared philosophy in both content and delivery. A common example came from the shared delivery between the strength trainer and the physiologist,

*I'm using [my own] guidelines on fuelling, but I'll try to get the guidelines that the physiologist wants to be delivered too. Because I happen to have more contact with the athlete, I might deliver them because I see the athlete several times a week or I'm with them at the times that fuelling is an issue. So it's his area, but maybe I might be the one to deliver it at the time and the athlete knows that this is what the physiologist wants for fuelling and I'm going to do it* (P11).

A SPC recounted a similar experience on his first PET,

*one of my first experiences with the PET was when a physiologist and I both worked together and I couldn't be there all the time, so when I wasn't there, I*

*knew he was aware enough of what I did that he was reinforcing that with the players. He was suggesting things that he'd heard me say or reminding them of ways to work at things and it made a huge difference to how effective I could be. I was doing the same thing when he was gone. I was making sure they hydrated during their workouts because - again I'm not a physiologist - but having a Phys ed degree I know enough about the basics and after being around him for a while I knew some of the things that he wanted reinforced and encouraged* (P7).

An important aspect in managing shared roles was the status of the relationships between the members involved. Being content with other team members implementing, suggesting, and/or monitoring aspects of any one particular discipline relied on a high level of comfort among the team members. Trust in team members and strong relationships were needed to allow other members to deliver and support training in areas outside of their main discipline. For example, when the SPC worked with the physiotherapist,

*I communicate with the physio about what they're doing with the athletes specifically, sometimes even to suggest when they're doing certain exercises; they get [the athletes] to do imagery at the same time. So I think that comes with the experience and time, we might not have been comfortable four years ago because we didn't have those relationships* (P2).

A physiotherapist supported this statement based on her relationship with the massage therapist,

*maybe the massage therapist and I have the most overlap, but I think we have a fantastic working relationship with each other. There have been other situations that haven't always been the case on other teams where there is a lot more overlap, but a little bit more territorial component* (P8).

In addition, consider the relationship needed between a strength trainer and a physiotherapist,

*I need to work very closely with a physio because there's this overlap in our scope of practice. Physio's are dealing with injury on a regular basis assessing in clinical settings and might prescribe exercises to correct a muscle imbalance. I might also prescribe an exercise to correct a muscle imbalance, so there's where we bridge* (P1).

The physiotherapists' response reflected a mutual understanding, "[shared roles] helps the understanding and communication between us" (P8). Thus, fostering positive team relationships (social cohesion) also gave PET members confidence to implement programs from other areas, while working with athletes in their own discipline. Another PET member acknowledged,

*if we're all on the same playing field in terms of knowing the knowledge of the group then those people can reinforce very subtly the same message, and allow people then to gain confidence in a certain area. I think that it is very important that people do know what is happening in all areas so at the appropriate time reinforcement can be given, but it's actually the same message* (P3).

This member highlighted the importance of understanding team cognition and the roles of other team members. Learning how to blend these different roles within the collective work product is essential for consistent delivery (MacMillan et al., 2001). Most service providers echoed the need to have a consistent message in service delivery when using shared information. One PET member suggested, "overlaps in delivery may be a problem if everyone isn't on the same page. When I cover a session, I will give similar information, not contradictory" (P12). According to PET members, a similar philosophy was needed in order to have seamless delivery among members.

*Role blurring as an advantage.* Some members viewed the existence of shared roles to be an advantage of the PET, especially when service providers weren't available when a need arose in that area. For example, even though one SPC was not a counselor, there were times when that member was the only one available at a crucial time:

> *if I go off with a team and there's a death in the family with one of these athletes, I'm not a counselor, but I'm their only connection even potentially close to that, so I may have to deal with it. I know that I would be overstepping my boundaries, but in the circumstances, is it the best thing? I think those are some of the things where we don't necessarily know what's best and what's not, so we try to work with the athlete to find out what's best for them [and the issue]* (P2).

This example supports the advantage that overlapping roles and shared expertise bring to the PET. Without this role expansion, service providers may not be able

to fully integrate all areas of performance when most beneficial for the athlete. PET members acknowledged that the overlap of knowledge was essential as highlighted in the following quote, "I've had PET meetings with other sports now and it's getting more about each person's discipline [not about overlap or integration] and that's not the way I think it should work" (P1).

PET members were not always comfortable taking on other discipline roles, yet they were keenly aware that they needed to do that role in order to do what was best for the athlete in that moment. In addition, most service providers accepted that other members, usually the coach, might be the take on any role to some extent if that service provider was absent. For instance, if there was a certain situation with an athlete that needed to be addressed on the road, but the appropriate service provider wasn't there, then the coach needed to know how to handle that situation. In one case, this facilitated a conversation about how to handle a specific situation, some techniques to use, and a clear agreement that the coach would be taking on that. In other professions this is called "role release", and it involves the transferring of some functions of a primary discipline to another team member (Lyon & Lyon, 1980). This flexibility in roles can mitigate the impact of absenteeism when there is a demand for services, but a lack of appropriate service providers (Ruddy & Rhee, 2005). In sport, this often occurs when the athletes are traveling because most PET members don't travel with the athletes; role release allows the members who are available to step into other disciplines when needed by the athlete. On PETs, the SPC supported the coach taking on some of the mental training as illustrated, "the coaches should be in on

some the mental training, [especially] if the mental trainer isn't there. Should physio come from the coaches if the physiotherapist is not there? I don't know" (P2). Nonetheless, these overlapping roles needed to be addressed in some way.

*Drawing lines in the sand.* Even though the PET members embraced and supported overlapping boundaries, they admitted that sometimes members step too far over these boundaries. The nature of an IC approach could lead to unclear roles, "in any group of individuals you're always going to have people who are going to step outside their roles, at least in our setting, we just need to talk about them and deal with them" (P1).

All PET members concurred that there was a need to know where the boundaries were in order to avoid any confusion; most couldn't identify them, but they were well aware of when those boundaries had been crossed. Members referred to this as stepping outside of the disciplines' scope of practice: "scope of practice is one that we try to talk about and people need to realize they can't start talking about all these other areas" (P10). According to some members, it was usually the younger, less experienced members that had difficulty defining their scope of practice.

> *What I have found is that when you are working with a new young service provider they overstep their bounds all the time. They're passionate, excited, they've read all the stuff, taken sport science in school, then they start talking about lactate testing as if they are trying to give us knowledge* (P10).

It seems from this perspective that it wasn't just that they might be overstepping their boundaries, but also the communication style used displayed a sense of

expertise that hadn't necessarily been earned. When discussing this with another member they remarked,

> *I think that's part of maturing and growing. I find that the "senior" people tend to have that understanding. They know that a lot of stuff is grey, so they have strong positions, but they're also open to challenging their own positions through new information. They certainly don't like to see the younger person come in and start throwing out a lot of strong statements, so it's a lot about experience* (P9).

As the interviewer, this sparked the question; "how do new members find their place on PETs"? In response, one senior member replied, "young providers fit in here well because what everyone needs is knowledge, but when you are sitting with a guy that's been doing it for 20 years, I'm cross-eyed after two minutes of babbling, I'm far beyond what they are saying" (P10). Wanting to hear other views on qualifications and expertise, I probed the two youngest PET members. Both members supported the views of the more senior members. They seemed to believe that scope of practice was determined by the amount of education they had, the type of courses they completed, and their personal experiences as a practitioner (limited as they were on the PET). In addition, I perceived them to become quite defensive in their statements when discussing their qualifications. For example, one member replied that s/he was qualified "because I've taken [discipline specific] courses and I'm a former athlete, so I understand training demands, training programs, and the medical side of things. I feel pretty comfortable in being able to understand everything that's going on

from all the disciplines" (P6). Some senior members were uneasy with these particular members stepping into the so-called grey areas and releasing roles to them because of these all-knowing types of statements.

Not surprisingly, younger members were not the only ones overstepping their boundaries; several examples of senior members overstepping their scope of practice were revealed. For instance, one member stated, "it's very important to know the boundaries; just because I have some knowledge of physiology, doesn't mean I talk about physiology in our meetings. I might ask a question for clarity, but I don't ask for clarity because I'm questioning" (P9). This member also suggested that going too far included speaking as an expert outside of your own area,

> *in a meeting it's when a person starts to give a lot of information on behalf of the other person, I think they've probably gone a little bit too far into another professional's area of expertise. At the end of the day you can't stay current in every discipline and you have to be careful that you don't think you know something when that information is already seven years old, especially when you're working with athletes who are three tenths of a second away from winning. If I was working with developing athletes I could probably even give physiological advice to some degree, but when I'm dealing with [elite athletes], I couldn't possibly suggest that I would know that area [well enough]* (P9).

There were other times when senior members purposely overstepped their boundaries with younger members, "I overstepped my bounds [because] they

couldn't see the bigger picture, so I made a decision and they didn't like it, but too bad. I wasn't playing heavy, but in this situation they didn't see the bigger picture and I did" (P10). Also, overstepping boundaries appeared when two senior members hadn't agreed on the content of a shared role.

> *One thing that I recognized was that these athletes show up on a regular basis for training and they have residual tightness and telling them to stretch really doesn't work. So, I went out and did a class on a soft tissue release technique that you can use quite quickly and help loosen people's muscles up. It's a form of treatment that the physiotherapist or the massage therapist might do and I received a lot of flak for doing it. The thought was that it's outside of my scope of practice, which definitely caused a problem* (P1).

SPCs in particular required defined boundaries and became upset when other members overstepped into the mental training area. For example, "support staff often hear athletes complaining and they try to fix everything, instead of sending them to the right service provider to help fix the problem" (P2). Another SPC echoed this complaint, "I suggest that everybody thinks they know psychology and I don't mean that facetiously, everybody thinks they know people. Sometimes that presents a unique issue, I think there's a fine line there and we have to protect scope of practice" (P9). There was definitely a territorial component by the members in this area, perhaps stemming from a lack of appreciation for the required expertise in this area (i.e., the perception that everyone can do mental training).

Part of the problem leading to overstepping boundaries was the lack of clear lines indicating where those boundaries were,

> *there are definitely not lines drawn in the sand. We still collaborate and provide each other with feedback, but there has been some criticism from one [area] getting too far into [another area] and making recommendations and that was a problem. It's a definite issue, but the more people work together, the more information you have* (P1).

Because of this, it was difficult for team members to know if they were doing too much, "boundaries still haven't been set and to be honest I'm still not clear on where my boundaries would fall" (P1).

Scope of practice was an area of team functioning that was addressed on a continual basis. Most team members felt that it was a "tricky matter; I don't usually say anything at first, but then I remind them of scope of practice. If they keep doing it, being the senior person I'd say you know what, knock it off" (P10). As a result, agreements between service providers were reached concerning work duties in these grey zones. For example, a younger member offered this agreement,

> *we try to stick within our areas knowing that somebody has more knowledge, even though I might have a ton of knowledge nutrition-wise, fuelling wise, and I can speak to it, but I'll let the expert talk to it because we respect each other and respect those boundaries* (P11).

Two service providers that seem to have the most overlap in roles were the strength trainer and the physiologist. On one PET, these two members made agreements about delivering similar programs,

> *we've agreed that the physiologist will work with the coach on sport demands and assessment. The strength trainer is going to stay focused on how to improve performance, but there is crossover. The physiologist just did warm-up and cool downs, which could be either of our jobs, but we are pretty easy going. He's not too protective and I'm not too protective so whatever it takes to get the job done* (P13).

Most team members agreed that if the problem was outside of their domain they needed to be very careful of their expertise, "we have our own style of doing things and we respect each other's boundaries because we've chosen where our boundaries are" (P8). In many cases the members and the coach just "have to trust that the expert knows what they are talking about" (P4).

## Summary and Conclusions

In summary, PET members wanted scope of practice adhered to, but the reality was a grey area within the teams' collective knowledge. By one coach's admission, he wanted all members to deliver a seamless service to the athletes, which often required them to act outside their boundaries, even if just for a brief period of time. This coach requested that all members play the role of SPC, in terms of keeping a similar message in the back of their mind. S/he did not want or expect members to go overboard in that area, because if they were not experts in that field then it could get convoluted.

It appeared that team members were expected to step into the grey area, but not beyond it, where the imaginary boundary line indicated that the member had gone too far. One coach clarified that everyone has a main discipline with some blending - everyone should merge a little bit, but not too far. A PET member also agreed that members needed to not go beyond their scope in practice, but how they do this was ambiguous.

Still, it was essential for service providers using a collaborative approach to have a good grasp of high performance demands in their areas, the overlap, and how they're affecting all the other areas in order for the approach to be successful. In other words, PETs need to take advantage of team cognition and their shared mental models in order to provide the best care to the athletes by way of an effective delivery process. Through team interactions, effective team cognition resulted, allowing members to act implicitly on behalf of others. The expected outcomes of team cognition included better task performance (service delivery) and better team processes (communication and coordination), which in turn led to an increase in cohesion, trust and satisfaction within the team (Cannon-Bowers & Salas, 2001). The PET members reproduced these outcomes supporting the findings in the literature.

The literature on team processes indicates that as a team acquires expertise, their taskwork and teamwork knowledge becomes more refined and shared with other team members (Kraiger & Wenzel, 1997; McIntyre & Salas, 1995). This was also the case on the PETs studied here. As a team gained experience working with each other over a number of years, they expressed increased comfort in

sharing information, increased understanding of other disciplines, and increased trust in consenting to shared roles. This in-depth knowledge led to a refined level of shared knowledge specifically of what team members were likely to do in any given situation and the use of implicit communication. This reduced communication costs by increasing the quality and quantity of information transferred and enhancing the accuracy of interpreting the message (Eccles & Tenenbaum, 2004).

In conclusion, PET members believed that the cost of the IC approach was worth the risk. The members deemed having delineation of responsibility useful but it should not come at the cost of overlap in expertise. Similar sentiments were widely expressed; members felt that having two people to do a job was beneficial because they could accomplish more when they were expressing the same message. Some members saw shared roles as a benefit, not a hindrance because the overlap allowed other members to step in if one member was absent. These members felt that the benefits of shared roles and overlap in expertise were more important than the possible risks associated without it. These risks include giving mixed messages to athletes, prescribing contradictory changes in training, and/or ignoring issues because they might be outside of disciplinary expertise. Therefore, guidelines or boundaries were needed when acting on shared knowledge and using team cognition. Until these guidelines are established, PET members will continue to struggle to find a balance between integrating information and sharing roles, while maintaining scope of practice, with the former being essential for effective IC.

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# CHAPTER 7: SUMMARY AND CONCLUSION

This Chapter is divided into two sections, a summary section and a conclusion section. In the summary section I provide an overview of the entire study, a big picture view of the results and personal reflections on the findings. The conclusion section will discuss practical implications of the study such as suggestions to improve and develop PETs. Also, I will highlight the significance of the study and provide ideas for future research.

## Summary

The purpose of this study was to explore the utilization of IC on PETs. More specifically, I explored the processes used in IC, attempted to understand how IC operated in a sport setting, and examined PET members' perceptions of how IC might improve performance. The results were compiled from the interviews, observations, field notes, and CSC documents (See Chapter 3 for full details). The ultimate goal was to be descriptive and inclusive in understanding these processes and in the presentation of the results. IC was explored as a collective case study, where some information was within the bounds of the case and other information was outside of those bounds. The result was three papers, which were represented in distinct groupings that I perceived best fit together in order to tell the story of IC on PETs. These groupings were related to specific themes from the data and the interconnections between those themes.

Chapter four set the background for PETs by describing in detail the composition of the teams and compared the PETs at different development levels. This discussion examined the individual characteristics of the PET members

(including team composition and team size) and team cohesion that resulted through collaborative efforts. A key feature of the team composition was the inclusion of the coach who played a pivotal role as the team leader. In addition, adopting a shared philosophy and the centralization of members emerged as important factors to effective team functioning. Finally, this paper explored the PETs as they developed over time and concluded with an overall summary of the PETs and suggestions for future inquiry.

Chapter five examined of the use of IC, specifically how collaboration occurred and what processes were used. Informal methods seemed to be an essential part of sharing information and observations, and as members increased levels of contextual intelligence it promoted and strengthened shared knowledge. While sharing information, confidentiality became a complicating factor as service providers were left to their professional codes of ethics in determining what was confidential and what could be shared. This Chapter concluded with a summary of some benefits and barriers of IC that were mentioned by the participants.

Chapter six explored outcomes of IC, namely, shared roles, team cognition, and implicit communication. Once team members had sufficient contextual knowledge and shared expertise, they used implicit communication strategies to guide their coordinated actions. In order to decipher team cognition and the ability to coordinate implicitly, an understanding of roles was needed. Many members addressed shared roles by having agreements with each other on sharing specific responsibilities, even if outside of their specific discipline. However, a grey area

existed and sometimes members stepped too far into another member's area of expertise. Exploring these boundary lines left as many questions as answers and new areas to investigate in the future.

*The Big Picture*

The intent of this case study was to explore IC in sport and prior to the data collection several questions were posed that helped provide boundaries for the scope of the research (see Chapter 1). In order to reflect on the overall findings of this study it is imperative to readdress these initial questions.

The first guiding question asked, "How does the PET work?" Chapters four and five took an in-depth look at what the PETs do and how they function. In essence, PETs work together following a shared philosophy and are generally led by the coaches. They meet formally on a regular basis and maintain on-going communication in-between these meetings. Through their communications, information was shared that was largely performance related. This included information on injury, results, areas of focus in all disciplines, yet occasionally consisted of sharing service delivery methods, discipline specific ethical guidelines, and preventative measures such as injury monitoring and upholding athlete responsibility in all areas (the type of information shared addresses guiding question six).

Three other questions (questions 2-4) focused on how IC facilitated athletic performances, provided multiple perspectives, and was integrated by each discipline. In summary, the use of IC provided a holistic focus for athletic training and allowed performance issues to be solved using multiple sources of

information before they could become too detrimental to performance. These multiple perspectives were fostered by sharing information and observations by PET members. Having multiple perspectives on issues opened up possibilities for finding a solution and providing preventative measures. The integration of these ideas was the responsibility of each PET member in their respective areas, particularly on how to incorporate the ideas effectively. Having a shared philosophy enabled this type of integration, which was supported by members who were willing to accept new ideas. The integrated information kept the overall program consistent among disciplines by ensuring a shared message.

Lastly, one guiding question (question 5) asked how participating in IC had influenced members' perspectives. Many PET members stated that using an IC approach had changed the way they practiced; they now look for several sources of information before suggesting a solution to bigger performance issues. This changed personal philosophies in regards to service delivery, contributing to innovative methods for communication such as sportweb (a web-based site that allows coaches and PET members to share information, update training progress, and note performance issues from anywhere in the world), and opened a willingness to share information with others.

Addressing these original guiding research questions helps to contextualize the findings enroute to exploring the bigger picture. The original questions were explained throughout the results sections; however, several important factors need more elaboration. These areas include (a) implications of a homogenous PET, (b)

understanding transitions in PETs development, (c) PETs effect on athlete performance, and (d) the role of the physician.

*Homogenous PET.* Chapter four discussed the characteristics of the PET members. Although, the impact of the homogenous team from a sociocultural perspective was not elaborated, the teams were homogenous in their chosen method of collaboration. The equal expertise model suggested that members were the same in terms of power structures and contribution of knowledge. On most PETs, this is generally true, with the exception of new and/or inexperienced members joining the team. I did not observe or interpret any overt actions to indicate that one member's contributions were more important than others. What was evident was that each member was viewed as the expert of his/her discipline and comments were taken as such. It is possible that the members withheld their opinions on this issue in order to present the best portrait of the team as possible. Or, individual members may have thought that they were the highest-ranking member of the team and didn't want to suggest that others were not as important. However, the possibility exists that team members believed that all members are needed and made equal contributions to the holistic development of the athlete and truly supported the philosophy of the PETs.

It was not clear from the findings whether new members were treated as equals because they needed to earn their place on the team, or demonstrate their expertise by working collaboratively with the others. My opinion is that because the new members were both inexperienced in their field and needed to earn their place as an equal over time, they were put in a position of having to defend

themselves and their knowledge levels. This was not uncommon among sport teams going through the formation stages of development, as they re-sort the roles and expectations as a new team. With enough time - which could be different for every team and each situation - the new members would reach an established stage of equal weighting. This overall process is related to the personalities of the members and sharing a clear vision with the new members in order to help them fit into the existing system.

Another potential problem that might be explored on these homogenous teams is the possibility of "groupthink" (Janis, 1982). Groups may suffer from biases when all group members agree on nearly all pieces of knowledge and information (Janis). I did not discover any significant conflict among the team members. In one observed meeting a disagreement occurred over a chosen action, but the coach made a decision and the PET member eventually deferred judgment. In another situation, conflict arose over a team member overstepping his/her role. The team addressed this by holding a meeting among the members affected and some boundaries were set up. I wondered if the lack of conflict was due to the high respect given to each member and their discipline, whether individuals genuinely agreed on specific actions, or if there was an unwillingness to share alternative opinions in my presence. Generally the literature suggests that conflict and debate may serve a necessary role in prompting groups to act outside of their usual routines (Gibson, 2001), yet agreements and integration are important factors in collective cognition and collaboration. Therefore, the possibility of the

PET falling into groupthink based on the homogenous nature of the team is probable, yet seemed unlikely in the PETs studied.

*Development of PET.* Chapter 1 examined the development of PETs by comparing three different teams. To summarize, as the PET developed and gained more practical and team experience, several progressions occurred. These included increases in: (a) team cohesion; (b) the use of formal structures - such as timely group meetings; (c) team cognition, (d) the amount of information shared; (e) clarity over what the shared philosophy meant to each individual; and (f) the use of effective informal conversations.

What was left unanswered was an understanding of who leads the transitions between stages. The results of this study demonstrated that a more experienced team ended with a more coach-led program and the experts supporting the coach rather than the coach changing his/her program to fit the ideas of the experts. This transition seemed to take place at some point in either the PETs or coaches' development, but when exactly it occurred and how it happened was not understood. I did not get a sense of when the coaches took the lead over the PETs, but I speculate that at some point the experts started handing over more responsibility and increasing expectations. In fact, it is unclear who decided that it was time for the coach to take a leadership role over the PET. I suspect that the team members, at a crucial time, negotiated with the coach to take a more active role in their training programs, in doing so, restructured the roles and expectations of the team members. To answer these questions more thoroughly, I would need to go back and specifically focus on the process of leadership and how this role

was delineated as the PETs moved through the development process. Understanding this transition could have implications for future PETs because they might have difficulties knowing when and how to move forward from an expert-driven process to a coach-driven one.

*PETs effect on the athlete.* An implied outcome of IC and the PETs was a positive impact on athletic performance. This seems reasonable given that a more holistic view of the training program and the athlete would make problem solving easier, along with delivering a seamless program between service providers. However, I have only testimonial evidence to suggest that the PET affects performance. At this stage I can only suggest that collaborating on training programs and viewing the athlete from a holistic perspective could indirectly affect performance. By sharing information the PET decreases the chances of injury occurring due to overtraining or undiagnosed issues and increases the chance that concerns are dealt with before they could permanently affect performance. In addition, knowledge integration aided the athletes in maintaining a balanced focus on the four performance areas. The answer might lay with the athletes; do they believe and have evidence to support that their performances are better with a PET than without? Certainly, including the athlete's perspectives on this issue could provide a deeper understanding of the effectiveness of the PETs ability to improve performance.

Another interesting finding was that the PET members formed very close friendships with the athletes, which took the client-consultant professional relationship to a different level. Although this isn't uncommon in a profession

where consultants and clients work closely together over a significant amount of time, (Kell, 1999) it is cause for caution. It is possible that the relationship could affect both the perspective a service provider has about that athlete's training and may increase the difficulty in putting personal feelings aside in order to function effectively on the team. This also has implications for confidentiality and determining if the athlete is sharing information to a PET member or a friend. The issues and questions regarding confidentiality were discussed in more detail in Chapter five.

This dilemma of friendship leads into another area of interest, the coaches. With the coaches being members of the PETs, they are privy to most of the information about the athlete. In fact, most PET members suggested that it was of the utmost importance for the coach, above all else, to have the information from all areas. When issues weren't discussed with the group, they were always discussed with the coach, within the discretion of the member (some information stays confidential to certain providers). This raises some ethical questions in regard to the power a coach has over his/her athletes. For example, in some sports a coach needs to choose only a few members to go to certain competitions, or to be designated starters on the team. With inside information, the coach could discard certain athletes based on non-performance related issues. This puts athletes in compromising situations where they have to trust the coach and the service providers to do what's best for them and their needs.

I can see this issue as especially noteworthy with developmental athletes because the coach has to make difficult decisions regarding team selection. If the

information is abused at these lower levels, athletes will be less likely to trust a collaborative setting in the future and might be less likely to share openly and honestly with consultants. Having said that, with the PETs in this study, the athletes are at the highest level possible in their sport and likely would not share the same concerns as younger athletes. They seemed willing to do whatever it takes to perform at their best and that includes allowing the coach to have any information that could improve weaknesses and maintain or improve strengths. Nevertheless, exploring the athletes' views on this issue would be extremely insightful and might be considered as a future research topic.

*Role of the physician.* Having a physician as a member of the PET offers unique challenges for both team members and team processes. Physicians have very special skill sets that require specialized knowledge and training. This makes acquiring contextual intelligence around this discipline more difficult than others and sharing roles unlikely. With other disciplines the service providers were able to share delivery of certain programs and make agreements on shared messages, which was not something they were able to do with the physician. Although the physiotherapist and physiologist could relate to the physician in terms of injury rehabilitation, the overlapping scope in knowledge was narrow. It was evident that the physician spent the majority of his communications with these two disciplines and the coach directly. At a formal PET meeting, the physician used a more reporting-like style to impart his information and received very little feedback from other members. I observed a discussion at one meeting about an injured athlete where the physician gave his status report on the athlete's likely

return to training. The other members discussed how this knowledge would affect their areas, but none of the members suggested other scenarios. Members did ask for clarification on the types of activity that could be performed immediately and agreed on a method for delivering a positive attitude around that athlete, of which the physician was a part.

Perhaps because of this separation, the physician spent less time at the training venues and less time in informal settings with other PET members. In addition, lower amounts of information sharing led to more difficulties integrating that discipline into the others. The physician in this study was aware that s/he was on the periphery in terms of information sharing and role sharing. S/he admitted that s/he should attempt to become more knowledgeable in the other areas so s/he could support the other disciplines by sending a consistent message to the athletes s/he sees. When it comes to informing the coach on an athlete's medical status, the physician adheres to very strict ethical guidelines through which he only shares very general information and no personal health statistics. Unique to this relationship with the coach was a definite power shift from the coach-led model. If the physician decided that an athlete could not perform, then the coach could not overrule that decision. Therefore, the physician was in a unique position of having authority over the coach and the training program.

*Team Effectiveness*

PETs are work teams in which members work together to accomplish a shared goal. These work teams were mentioned in Chapter two along with what represented an effective team. Team effectiveness was defined by engaging in

continuous diagnoses and evaluations, having a shared purpose and understanding of team resources, and using effective processes while preserving member satisfaction. In exploring the factors involved in team effectiveness, I referred to three areas: team characteristics, team processes, and team outcomes. These will now be addressed in relation to the findings of this research and how they relate to team effectiveness.

First, team characteristics were discussed in Chapter one, where the makeup of the PET was described and explored. Although a smaller team size requires less organization, the largest team in this study was well organized and experienced few communication or cooperation breakdowns. All PET members had similar ideas on philosophy and agreed to work within the bounds of this philosophy contributing to overall effectiveness. This effectiveness with member personalities was exemplified through the use of shared roles, which could only occur when the members felted they had trust with each other and in the teams overall goals. Also, research has demonstrated a positive relationship between cognitive ability and team performance (Devine & Phillips, 2000), and it is a fair statement that the members of the PETs would be considered experts in their respective disciplines resulting in high overall cognitive ability.

Secondly, team processes play a large role in determining team effectiveness. Even with an advantageous team composition, effectiveness only occurs when members communicate and coordinate at high levels. Chapters five and six address the different ways the PETs communicated and coordinated their expertise highlighting their use of shared mental models, shared roles, and various

communication methods. These Chapters indicated the teams' high ability levels to share knowledge, integrate knowledge, and act implicitly on each other's behalf, which suggested an effective team (Kilmoski & Mohammed, 1994). Once these processes are in place they act in a cyclical manner in which shared cognition leads to better team processes and task performance, which contributes to more sharing of knowledge resulting in team cohesion, trust and satisfaction with the team.

Satisfaction and team cohesion are outcomes that result when the team is functioning effectively and they constitute the final area for team effectiveness. These factors are the primary determinants of team effectiveness. The PETs in this study indicated throughout the research that they respected their colleagues and felt connected to them (social cohesion) and that their team was working diligently to reach the shared goals (task cohesion). These positive perceptions of cohesion lead the members to feel satisfaction with being a member of the team and with the job they were performing on the team. The more satisfied the members felt the more likely team cohesion will increase. This is an ongoing relationship that can change over time, so team outcomes need to be assessed regularly by all members in order to ensure team effectiveness.

These team outcomes also rely on having agreed roles, norms for behaviors, and success of the team, which ultimately leads to successful athletes. How the team handles roles and norms were displayed in the use of developing a shared philosophy and agreeing on acceptable roles for each member. I suggest that these

were constantly monitored and altered through meetings and negotiation as circumstances and members changed on the team.

In conclusion, I think the findings of this study support the notion that these specific PETs are effective in enhancing team performance based on the three areas explained above. But, whether they are successful in terms of athletic performance has yet to be clearly understood. Athletes themselves need to be questioned for their perceptions on the impact of the PET to their performances. Having said that, it does not diminish the value of the PETs and the need to understand them. Certainly, sports organizations, coaches and athletes could benefit from the expertise and processes used by PETs. Some of the benefits and barriers of using the PET concept are outlined below.

*Benefits of PET*

Working together on training programs to help athletes achieve best performances resulted in an overall positive experience for the PET members. When asked if the participants would prefer to go back to a unidimensional or multi-dimensional delivery model most members unequivocally rejected the idea. While exploring their use of IC, the participants brought to light many perceived benefits to working as a team. The first of these was enhancing perspective; as described throughout this study, sharing information shed light on specific situations and allowed the members to see another perspective. For example, it gave members an opportunity to find out how other issues may be affecting an injury or how subtle things that may not have been thought of as being an issue really were. Sharing information in and of itself was considered a benefit, because

communicating observations reinforced initial concerns about athlete training that would not have come up if the members had gone through a simple checklist. Additionally, it helped members stay informed on training progress in case they needed to act on the information at a later time. Through the use of informal conversations, information was exchanged quickly and accurately, which increased awareness of potential athlete issues among the members. These communication structures often created an openness, which resulted in information being shared that might not necessarily have been if using a different model of service. Once information was communal, an opportunity existed for team members to problem solve more effectively by listening to ideas and solutions from others. This was beneficial because issues could be handled when they were directly affecting the athlete or prevented before they even happened.

As mentioned, the PETs adopted an athlete-centered philosophy to their team structure. This holistic outlook was viewed as a major benefit to the PET and was based on the idea that no one discipline or professional owned athlete development. Using this outlook, the members were challenged to think more holistically and critically about how other disciplines affected theirs. The inclusion of other areas created an interdisciplinary approach, which gave the members and the athletes a more complete picture of training. One participant strongly stated that it could be a waste of time to proceed from a one-discipline point of view because advice could be very inaccurate or inappropriate. Members believed that input from all disciplines increased the chances of providing good advice to the athletes and suspected that there was could be no solution until the

disciplines work together. Furthermore, members reasoned that a holistic approach helped them understand the athletes' views more clearly. They were able to look for trends affecting performance and got a more complete picture of athlete responsibility. The bottom line for the PET members was that the athletes came to trust their advice because they knew the team was working together. Through this joint effort, the athletes developed respect for the disciplines involved and the members on the team.

Developing respect was also seen as a beneficial consequence from being on the PET because it aided in team cohesion. Team cohesion has already been discussed in terms of its importance to team functioning; plus, it was a favorable consequence for the PET. Being part of the PET encouraged support, renewed passion for the job, created an understanding of member roles, and produced an environment for success. Members felt that respecting the other disciplines was very rewarding personally because it gave them confidence in their own areas. Thus, learning from others kept the PET members humble and helped them become well rounded as practitioners.

Cohesion was easier to achieve when the teams met regularly because it created a sense of intimacy along with a component of bonding and rapport. According to some PET members, the athletes often felt cohesion among the PET members and this built confidence in the training program. Also, cohesion affected professional practice of many of the members. Some members suggested that they tended to seek out people more often and made an effort to keep informed on all levels of the program. They seldom created a perspective without

knowing more from the other areas, which was something they didn't do before they were part of the PET. Getting the full picture stopped them from creating something that was not necessarily an issue. Seeking out other perspectives led to insights in programming that could be supported or integrated in all areas and could promote an effective response to a problem. Most of these changes in professional practice occurred as a direct result of participating in IC.

Lastly, the structure of the PET as directed by the CSC and the coach kept the PET organized and manageable. It was easier to interact and respond when everyone knew what was expected at the meetings. The formal meetings opened dialogue for members to share insights and give advice, which was seen as an efficient use of time. The result of the organized structure to the PET meeting led to innovations in both practice and programming, on two of three PETs. For example, one PET implemented a web-based injury surveillance monitoring and communication tool that could be accessed by all members regardless of their location. This had immediate impact on members' knowledge and stimulated ideas for further research into injuries and injury prevention. Another PET developed a working model of service delivery in relation to professional practice and member qualifications. This helped them develop ideas on how to develop the PET and aided coaches in understanding the knowledge levels expected of them.

Overall, the PET members in this study viewed their experience on the PET very positively. They felt that the benefits of working on a PET would continue to develop as the possibilities of such a team grow. However, in order to present a

balanced view of the PETs, consideration of some barriers to effective PET functioning is warranted.

*Barriers to PET*

Although the members felt strongly that the PET was a positive method of service delivery, they acknowledged some barriers. These were categorized into three distinct areas: the coach, the service providers (as individuals), and the PET (as a whole).

The first group of barriers related to the coach and included the aspects of the coach as discussed in Chapter four, namely, experience, organization, and information sharing. The PET members found that a key barrier was the coach him/herself. This was important as the PET moved from an expertise-led to a coach-led PET. If the coaches were too young and naï ve, they would not successfully control their own programs, therefore, the coach would need education in all areas involved on the PET and enough organizational skills to run the meetings. The PET members were looking to the coach to take over the team at some time, so, knowing what they wanted from the team and managing the PET was a necessity. Even with coaches who were currently leading the PET, there was a sense that the team was not meeting enough formally for all members to keep informed. This was particularly important when the team was traveling. Also, the coach was responsible for keeping the PET members informed of the training program objectives and timelines. When a coach didn't share this information in a timely manner, members couldn't proceed with their work. For example, the strength and conditioning specialist needed the periodization plan in

order to schedule testing, workouts, and technical training, so when it was delayed work in that discipline was also delayed.

On the other hand, service providers must do their share to keep the team running smoothly. The team members felt that the biggest barrier affecting their work was the time commitment required. Many members were also university professors or in private professional practice and found it difficult to maintain a high level of service while doing several jobs at once. They felt that having multiple jobs was necessary because the salaries given were too low for them to be on the PET full time. In fact, only a small number of participants in this study were full time PET members and remunerated by the CSC as such. Another barrier for the service providers centered on information sharing, particularly when there appeared to be a lack of openness and respect among team members. The members felt disconnected with individuals who appeared to be closed and not sharing, which impacted the level of cohesion on the team. Along with the lack of sharing, not knowing what to share was considered a barrier. All members felt that it was up to each individual area to decide what was important to share, and yet, they agreed that sometimes they weren't aware of what they needed to know until they heard it. So, not divulging enough information could be considered a barrier, perhaps only in hindsight. Alternatively, some members felt that too much sharing, specifically, "micro-level sharing" in meetings wasted time and took away from the PET functions. Finally, as previously discussed in Chapter four, being distanced by location or proximity to athletes and each other was viewed as a barrier. Without connections made at the training venues and in

hallways, the informal observations would often not be discussed, limiting the interdisciplinary nature of the PET.

The barriers of the PET itself encompassed the structure and nature of the team. Members who were less experienced on the PET often performed outside of their scope of practice, which could negatively impact both the program and team cohesion. A similar result occurred when members had a difference in philosophy, attitude, or agenda. Being on the same page was identified as a critical element to the foundation of the PET. Additionally, members cited the CSCs as a barrier in some circumstances. For instance, if the CSC administration became too embedded in the PET day-to-day functioning, the PET switched focus from performance to quotas, funding, or operations. Once the focus was no longer on the athletes, the purpose of the PET no longer existed for the members. Lastly, the financial compensation to PET members was prominent as a barrier to the team. Many members were not able to do the job that they would have liked to do because the amount of time that would be required was not sustainable financially by the CSCs. Overall, these barriers highlight the reality of working in sport in Canada and the difficulties in bringing together various experts on a team, both from a team composition and a team process perspective.

*Personal Reflections*

Now that I have summarized the findings in various ways, I will now reflect on these findings from a personal point of view. In interpreting the results and interacting with the PET members, I have come away with an enriched respect for the team members and their ability to continually strive for excellence. I believe

that they are making a difference to the coaches' training programs by including multiple perspectives.

I entered this research process with some preconceived notions about what a PET really was and assumed I would find support for these assumptions. Instead, I found that the process of IC was more complicated than I first appreciated. For example, I knew that the members communicated through formal meetings, but I underestimated the use of informal settings as a major source of information sharing. I believe that these informal opportunities are the richest source of information and times of knowledge integration among the members. This reaffirms my belief that service providers in general must be available not only to the athletes at various venues, but also to the other PET members. Furthermore, I was surprised to discover the level of integration that occurred among most members. I was not confident that integration was widely accepted; yet I found it present on all levels of PET development. The PETs had certainly evolved beyond a level that I had originally envisioned.

The evolution of the PET led to some surprising factors, involving overlapping boundaries, and the use of shared roles. From the outside, it is difficult to envision how service providers from such different disciplines could perform similar work-related tasks and be comfortable allowing others to step into their territories. The members in this study showed remarkable trust in their fellow team members and an eagerness to adopt new service delivery methods in order to best service the athletes. This openness extended to their efforts to share information and observations, particularly in areas outside of their own expertise. I think this

reflects the quality of personal characteristics that team members possess and the importance of choosing these types of people to be on the PET. I am fairly confident that it is better to have quality people on the PET than to have a member who is there to just fulfill a vacancy for a particular discipline.

I needed to accept that not all PETs would be able to reach the highest levels of IC based on their geographical location, the number of athletes/coaches available to them, the financial constraints of the CSC, and the availability of quality personnel. So, I think it is important to recognize that each PET must work as efficiently as possible within the constraints of their environment and continue to find ways to be interdisciplinary and collaborative.

Overall, I found this research an engaging process not unlike putting together a double-sided puzzle, which I happen to love to do. I never knew if the information I had found fit where I expected it to go until I tried to build in pieces around it. In those moments I realized that the one piece I was so sure of, did not fit after all. I think this highlights the importance of exploratory research. I was able to search out findings and try to fit them together, knowing that not all pieces would have a definitive place. This allows further research to support and reconfigure the results to form a new puzzle and a new understanding.

## Conclusions

The above section summarized and made sense of the data from a big picture perspective by examining the PET and IC as a whole. This section will provide practical suggestions on how to make use of the findings described above. In doing so, I will discuss implications for practice – how to develop and improve

PETs, outline the significance of the study, and provide some future research directions based on this study.

*Implications for Practice*

The exploration of IC on PETs creates a deeper understanding of how collaboration worked on these teams and described an alternate method of delivering services to athletes. This knowledge can now be used to create and implement models of developing PETs for other sports or coaches who would like to do so. To create a starting place for further discussion and ideas, I will present some strategies for developing a PET and make suggestions on how to improve PETs based on the teams studied.

*Strategies for PET development.* As the interdisciplinary approach becomes more popular, it will be valuable that lessons can be derived from the three PETs involved in this study. Based on my involvement with this study and my own personal experiences I suggest the following procedures to develop a PET.

First, if the coach is experienced, both in developmental level and with interdisciplinary teams, then possibly the coach could lead the team. If the coach is inexperienced, then a service provider who has the facilitation skills to chair the meetings might be identified and appointed. Sometimes this will be a SPC, other times it will be a physiologist, in any case a potential member of the PET might lead. SPCs typically have the facilitation skills to lead the meetings (Miller & Kerr, 2002) and their discipline is easily integrated into most other areas making them a natural fit to chair the team. Unfortunately, playing a dual role could be difficult for the SPC; the coaches should eventually assume this role (Reid,

Stewart, & Thorne, 2004). The appointed leader could mentor and facilitate the coach through this transition by assigning more responsibility throughout the process until both parties are comfortable with the change in leadership. In the end, the goal is to have the coach leading the PET and directing the team's activities as they relate to his/her training program.

Second, the PET might consider beginning with only a few members (no more than three) initially and include areas of which the coach has a moderate to strong working knowledge. Usually, in addition to the SPC, this would be a physiologist and/or strength trainer because these areas typically have the greatest knowledge overlap with the coach. Collaboration still occurs on small, less experienced teams by exploring overlapping knowledge and agreeing on shared roles. The benefit to the coach in having areas that s/he is familiar with is mainly the ease of integration and knowledge exchange among the members.

Next, an initial meeting with all team members is needed to establish a common vision and a working philosophy. It may be necessary to change the original team composition if the chosen members cannot accept a unified vision as outlined by the coach. At this meeting, the team could set up the expectations for all formal meetings to follow; what will be discussed, what information needs to be shared, and what kind of dialogue is expected. For example, the team leader could ask the members to think about how shared information could affect their areas and identify any concerns or consequences for their areas. The coach devises an agenda and knows what s/he wants to get out of the meeting. A typical meeting structure could include an update from the coach on the program and

individual athletes with a round table on progress in each area to follow. The members might not share everything they have done, rather, provide key obstacles or advances related to their area. Any other specifics can be relayed to the coach in a one-on-one meeting.

Additionally, an environment of openness and equality could be supported and expected in order to develop team unity and cohesion. Members might be encouraged to visit the training venues to talk to the athletes, coach, or simply observe. This can provide informal opportunities to touch base with the coach and the athletes, allowing information and observations to be exchanged.

Probably the most critical element to team success, in the early stages, is following through on planned meetings and making time to communicate regularly. The SPC (if acting as a facilitator) could lead the way by making an effort to seek out team members in both formal and informal settings. However, all team members could make this effort daily because without regular communication, the PET stops working effectively. In time, when the coach is ready, new team members could be considered such as a nutritionist, biomechanist, and/or a physical therapist. With the addition of new members, the existing PET members need to understand the evolving process of the team by supporting these new additions. When new members come into the mix, there is a process of learning and figuring out what those people are talking about. Because of this learning process, it is recommended that new members be chosen carefully and introduced only when the PET is functioning effectively, as determined by the coach.

*Improving PET.* Once PETs have been developed, it is necessary to continue to monitor the effectiveness of the team. Even though the PETs in this research have been working together for at least two years, some suggestions for improvement might be considered:

1. PET members within close proximity of each other and the training venues of the athletes is the ideal situation. If possible, offices, labs, and clinics could be within 30 minutes of each other to allow for easy access.

2. The coach, as the leader of the PET, could be trained in all areas of performance, either formally through the National Coaching Certification Program, the NCI and Universities/Colleges, or informally through the CSCs. It is important for IC that the coaches have a working knowledge of the performance areas to make the best use of the PET members. One informal way of aiding this process is to increase the frequency of PET meetings so the coach and members can get more familiar with all disciplines working within the PET. In general, increasing frequency of contact between service providers could increase openness, trust, communication, and lead to higher cohesion within the team.

3. More explicit communication is needed as many service providers still make too many assumptions about other disciplines. This requires continued effort on the part of the members not to become too complicit in their shared knowledge and to continue to seek out information.

4. Since working on PETs requires applied practitioners with vast knowledge and strong interpersonal skill sets, it is prudent to develop a mentorship program for younger professionals. Having younger professionals help in fitness testing,

educational sessions, developmental training groups, and shadow PET members, increases the likelihood that more qualified practitioners will be available as more PETs are developed. Furthermore, specific training in interdisciplinary settings, even simulated, would benefit young professionals by developing negotiation, integration, and communication skills needed to collaborate. This may need to be done in conjunction with the appropriate university faculties.

5. The universities could also provide shared resources for the CSC and the PET, both from a venue and personnel point of view. Establishing strong ties and shared programs could be essential in the survival of PETs. As it stands, most PET members are affiliated with a university and are located within the university, so they already have a mutual connection through personnel.

6. From a CSC perspective, there are still difficult decisions to be made regarding the value of the PET. If indeed the PETs are seen as highly beneficial to performance and podium results, then more full-time dedicated staff will be required to handle the time commitment required. Funding will certainly always be an issue in Canadian sport, but CSCs could make PETs a priority by hiring dedicated staff whose main purpose is to support the coach and his/her program.

7. The gap between administrators and service providers needs to be narrowed. Many PET members felt that sometimes the administrators had a shallow understanding of what was needed for the team to be truly effective. Perhaps this is a communication deficiency, however, it has been suggested by the participants that sport science needs a stronger voice in system, especially at decision-making levels. The inclusion of administrators in some of the PET meetings could help

narrow this gap. The administrator could handle the organizational aspects of PET and the athletes they service. This would allow the administrator an opportunity to understand the PET functions more directly and could help the PET members understand the restraints placed on the CSC. In any case, a stronger working relationship between these groups might enable the focus to stay on performance and away from other more administrative issues.

If these suggestions are implemented, the PETs could refine their processes and increase levels of efficiency and perhaps reach their highest potential, which has yet to be realized. Nonetheless, at the time of this study the PETs seemed to offer services that benefited athletes, coaches, team members, and the CSC as a whole. So, these changes could have positive impacts on the performances of Canada's elite athletes.

*Significance of the Study*

The impact of this study will ultimately rest with the readers and what they find personally relevant. However, I believe that there are several important findings that could directly affect people involved in Canadian sport. First, this study has indicated and outlined key areas of interest for coaches. For instance, they will now have an awareness of the expectations and knowledge levels required to begin working with consultants or PETs. Also, the findings direct the coaches' focus to potential disciplines where they may lack knowledge, which could guide their development and training. The knowledge imparted in this study might provide a sense of relief to younger coaches; they do not need to do everything when surrounded by a PET and can rely on the team to provide

knowledge in unfamiliar areas. Since IC potentially aids performance, athletes and coaches may want to become more personally invested in the "team" and their suggestions towards training.

Second, sport scientists have a great deal to learn about their potential roles on PETs and a different delivery method. Using a collaborative model opens new possibilities for the sport scientist to explore and can create meaningful gains in the athletes' performance. This includes more integrated services through knowledge sharing and allowing shared roles. Also, young professionals can focus attention on interdisciplinary coursework and training as they increase their experiences as a consultant.

Furthermore, having information about the PET model makes it less mysterious and more accessible to anyone who is willing to initiate a team. Using the suggestions on developing PETs will be beneficial in this endeavor. As a result of creating new PETs, there are new opportunities for employment and experience for practitioners. In addition, understanding how the PETs operate allows for improvements, potentially increasing the teams' effectiveness. This is particularly possible when existing PET members are exposed to different perspectives, such as the one presented in this study.

Awareness of the interdisciplinary collaborative process can help to broaden our understanding of teamwork, focus research on key factors surrounding collaboration, and evaluate the practical issues of collaboration in sport. This research could act as a backdrop for future questions regarding work teams in real rather than simulated environments.

The field of sport psychology can benefit specifically from the findings of this study. For example, the findings may give the sport psychology consultant substantial reasons to become involved in and initiate IC with other sport scientists, leading to more PETs in the future. In order for this to occur, SPC may need to closely examine the nature of confidentiality within the team and the need for all sport scientists to see athletes in a holistic framework. As mentioned earlier, I think the SPC could play a significant role in developing PETs by facilitating meetings and supporting the use of an integrated model of service delivery.

Finally, sport organizations and directors could benefit from this study by addressing the needs of service providers and making changes in their priorities. This has implications on how they use their limited resources and personnel effectively. Developing PETs even in a limited capacity with developmental groups provides tremendous opportunities for the coach, athlete, and the consultants to gain valuable experience while increasing performance.

*Future Research*

Literature on collaborative teams in sport is very new and our understanding of its potential contributions is in its infancy, thus, the findings should be viewed as a starting point. There is still a great deal to learn regarding the operations of the PET, with the challenge of not making it sound more grandiose than it is. As one participant remarked, there was too much rhetoric written about PETs making it into something more than it probably is. In reality, the PETs are just specialists dealing in their area and communicating effectively. Yet, there are unique features

to the PET that need closer attention, such as the benefits of overlapping boundaries, and the development of shared mental models and team cognition. These stem from theoretical constructs that could be investigated more thoroughly as a result of the practical knowledge established in this research.

Since PETs are service delivery models, research will need to focus on the role of the SPC and how this model alters service delivery in this area, as this discipline typically follows a very closed and confidential model of delivery. For instance, how can SPCs be more open with the information they share and receptive to new perspectives, and what guidelines could be devised to help facilitate this change.

To complete the picture on how PETs develop, a more in-depth explanation is needed on the transitions between the development stages; who leads these transitions, when this happens, and how this get negotiated. This highlights the construct of leadership, which was not addressed in this study. Future research should focus on how the leadership role on these teams is negotiated, transferred to the coach, and managed, specifically on equal expertise teams.

Finally, the athletes' perspective is absent in this research because they were not directly involved in IC but might provide additional knowledge in order to understand how PETs and IC affect performance. It might be the case that the athletes are not directly aware of the PETs use of collaboration or their levels of knowledge integration.

This study highlights aspects of an IC model of service delivery in sport, furthers our understanding of PETs, and outlines guidelines to develop PETs. The

findings of this study are a starting place to implement suggestions for developing, and using PETs, with the recommendation for further research to continue.

*Closing Remarks*

Preparing this research was a journey unto itself and deciding to group the findings as presented here a large part of that journey. I hope as the reader you see the logic in grouping the results into three sections and can envision the combined impact they have on our understanding of PETs. Since writing and representation cannot be divorced from analysis, each Chapter should be thought of as analytic in its own right (Sparkes, 2002).

The goal of exploratory research is to provide possibilities by expressing one interpretation of the data, which is given its credibility by the reader's ability to resonate with the participants of the study. Thus, the results are meant to highlight my interpretation of the data with the hope of sparking new questions and new journeys. Therefore, any applications of the findings will be particular to the reader and each reader and reading will produce different insights and experiences.

I believe that progress toward understanding IC in sport can have important effects on methods of service delivery used in sport, the focus on the athletes' well-being, and the integration of the four dimensions of performance. The completion of this research offers a glance into the use of IC, might be a stepping-stone for future use of IC, and perhaps the creation of practical models for IC. Clearly there may be benefits from exploring theoretical principles in order to

develop new theories on the use of IC in sport or further consideration of existing theories relating to collaboration. This research helps to illuminate areas and issues that could drive that next step. Yet, as interdisciplinary teams continue to grow they will undoubtedly develop into something entirely unique to the environment in which they operate. Roland Barthes stated that to do something interdisciplinary was to create a new object that belongs to no one (cited in Clifford & Marcus, 1986). It is my sincerest hope that the PETs evolve to reflect this ideal.

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# APPENDICES

## Appendix A: Information Letter to CSC

Dear [general manager],

I am a Ph.D. student at the University of Alberta, conducting my thesis with Canadian Sport Centre service providers, coaches and athletes. I am specifically interested in those individuals who are members of a Performance Enhancement Team (PET). The goal of my study is to understand how the PET works and how collaboration provides multiple perspectives on training programs or performance concerns. My interest in this study is a result of my work on a PET at the CSC-Manitoba.

I would like to ask your permission to contact members of the PET working at your Centre and ask for the opportunity to learn about the PET through interviews and observations. The total time required would range from 2-4 hours. If available, I would also like to ask your permission to read CSC documents relating to the PETs, particularly any document that sets rules or regulations on how the PET should operate.

If you would be willing to help with PET contacts, the information I collect will be made available to you in a written report once my research is completed. This report may provide a deeper understanding of the use of collaboration in sport and it's potential to improve performance. Also, the report may enable the participants to receive a better understanding of how the PET works effectively. It can also provide important support for the use of PETs as a resource at the CSC.

Given the way I will gather information (interviews, observation), the risks associated with participation revolve around the disclosure of personal, sensitive, and potentially confidential information. This may make some participants feel uncomfortable. If requested, referral to a counselor will be provided. Confidentiality will be kept for all Centres, service providers, coaches and athletes. I ensure the strictest ethical principles will be enforced and the Faculty of Physical Education and Recreation Research Ethics Board has approved this study. If you have concerns about this study, you may contact the Associate Dean of Research at (780) 492-5910, Dr. Brian Maraj. The Associate Dean has no direct involvement with this project.

Please let me know if you will permit me to contact members of the PETs and if you will provide written material that will enhance my understanding of this concept. If you have any further questions, please feel free to contact me. Thank-you for your consideration of this request.

Regards,

Lisa Rogerson, M.Sc.

University of Alberta
E - 424 Van Vliet Centre
Edmonton, AB T6G 2H9
lisar@ualberta.ca
Tel – (780) 492-3890

Supervisor: Dr. Billy Strean

University of Alberta
Edmonton, AB
Tel – (780) 492-3890

# Appendix B: Information Letter to PET members

Working Study Title: Interdisciplinary Collaboration

Investigator: Lisa Rogerson, M.Sc.
PhD.
University of Alberta
Edmonton, AB
Tel – (780) 492-3890
Email: lisar@ualberta.ca

Supervisor: Billy Strean,

University of Alberta
Edmonton, AB
Tel – (780) 492-3890

**Purpose and Background:**
My name is Lisa Rogerson, and at the moment I am conducting a study looking into how interdisciplinary collaboration functions in a sport setting. More specifically, I am interested in how the members of a Performance Enhancement Team (PET) work together to determine the appropriate training regimes and their perceptions of the PET's ability to improve performance.

**Procedures:**
If you agree to participate in this study, I would like to observe PET session(s) and interview you. I would like to interview you in an individual setting and possibly in a group, with the other PET members, to obtain a deeper understanding of points that may arise. The total time required from you in interviews will range between 2 - 4 hours.

**Benefits:**
The information I collect will be analyzed, and written up in a report. This report may provide a deeper understanding of the use of collaboration in sport and it's potential to improve performance. You will receive a summary of the completed report and may provide feedback based on the report.

**Risks:**
Given the methods used to collect information in this study (interviews, observation), the risks associated with participation revolve around the disclosure of personal, sensitive and potentially confidential information. This may make some participants feel uncomfortable. To guard against this, every step will be taken to ensure anonymity and confidentiality (see below). If requested, referral to a counselor will be provided.

**Confidentiality:**
Every effort will be made to ensure that your anonymity will be protected. In doing so, personal information will be coded and stored in a locked office to which only the investigator will have access. Data will be retained for a period of five years post-publication, after which they will be destroyed. The general manager, other service providers, coaches, athletes, or any other CSC staff will NOT have access to any information that can be directly attributed to you. Any athlete information or specifics from an observed PET session will not be recorded. The observations are included to capture such things as the types of communication used, how perspective is achieved, and how the process of collaboration works. I would be willing to sign a confidentiality agreement with the CSC in this regard.

**Freedom to Withdraw:**
You may withdraw from the study at any time by informing the researcher of your wish to do so. If you decline to continue your information will be removed from the study upon your request.

**Additional Contacts:**
If you have concerns about this study, you may contact the Associate Dean of Research at (780) 492-5910, Dr. Brian Maraj. The Associate Dean has no direct involvement with this project.

# Appendix C: Consent Form

Title of Project: Interdisciplinary Collaboration

Principal Investigator: Lisa Rogerson (M.Sc.), University of Alberta, lisar@ualberta.ca, Tel – (780) 492-3890
Supervisor: Billy Strean, PhD., University of Alberta, Tel – (780) 492-3890

Please complete this form if you agree to participate in the study:

| | | |
|---|---|---|
| Do you understand you have been asked to be in a research study? | Yes | No |
| Have you read and received a copy of the attached information sheet? | Yes | No |
| Do you understand the benefits and risks involved in taking part in this research study? | Yes | No |
| Have you had an opportunity to ask questions and discuss this study? | Yes | No |
| Do you understand that you are free to refuse to participate, or to withdraw from the study at any time, without consequence, and that your information will be withdrawn at your request? | Yes | No |
| Has the issue of confidentiality been explained to you? Do you understand who will have access to your information? | Yes | No |

This study was explained to me by: _____

I agree to take part in this study.

_____ _____ _____
Signature of Research Participant Date Witness

_____ _____
Printed Name Printed Name

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

_____ _____
Signature of Investigator Date

Appendix D: Demographic Information Sheet

Name: _____ Date: _____

Address:
_____

Contact #: _____ Email: _____

Canadian Sport Centre: _____

# Years at Centre: _____ Field of Study: _____

# Years on PET: _____ Sport Affiliation: _____

Appendix E: Interview Guide

**Grand Tour Questions:**
What's it like being on a PET?
What specifically do you do as a member of a PET?

**Mini Tour Questions:**
How does the PET work from your perspective?
What doesn't work?
- Shared attitudes, task knowledge, team member knowledge

Can you tell me how the PET planning process works?
- Cognitive consensus, moving from discussions to decisions

How do PET members participate in the meetings? How is this ensured? How does that work (if not)?
- Weighted information of members

How does (*your area*) get addressed in the meetings?
- Communication, understanding of jargon

How does *(your area)* contribute to the overall training program? Is it integrated with any other areas?

What happens to the training program once the PET decides on a course of action?

What effect has being a member of the PET had on what you do as a professional?
- Impact on practice?

Tell me about a time when your perspective has been influenced by the PET meeting?
- Do the PET meetings ever change original plan of action?
- Experienced a performance problem that was not initially indicated?

How do you discuss the performance dimensions?

How do you use suggestions from other members to integrate your area into an overall training program? (Integration of new knowledge)

How is athlete confidentiality handled in the PET meetings? Have you had any experiences involving confidentiality that you would share?
- Too confidential, or not relevant to discussions?

Who decides on the topics for the meetings?
- Timelines
- Leadership duties, informal/formal